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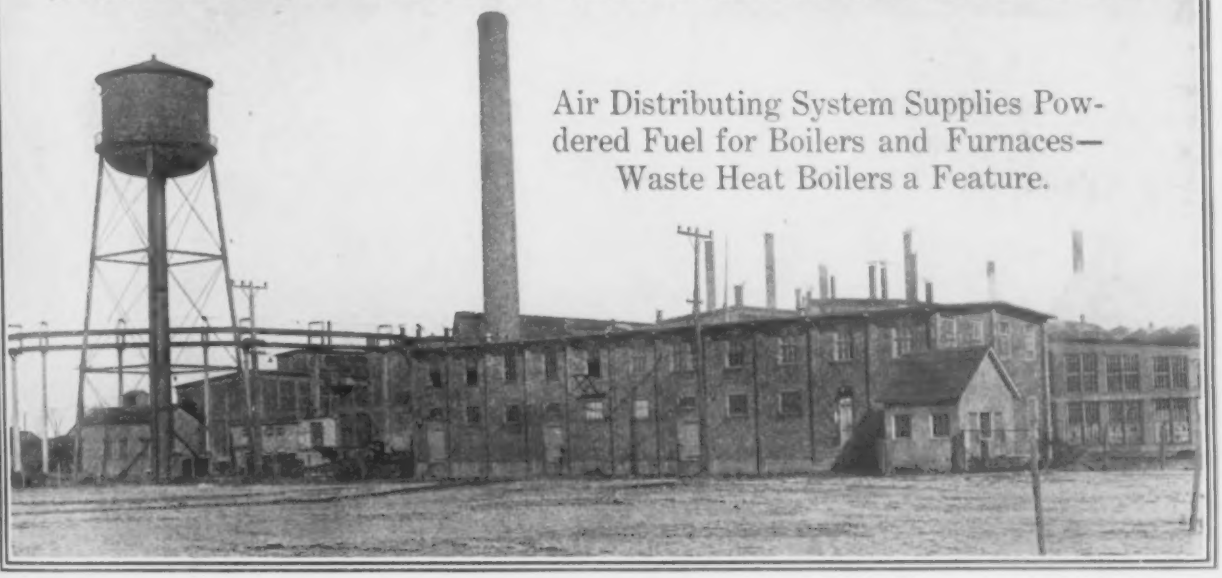
# Pulverized Coal In Canadian Steel Plant

## Air Distributing System Supplies Powdered Fuel for Boilers and Furnaces—Waste Heat Boilers a Feature.



BY C. F. HERINGTON*

IN the quaint little town of Longueuil in the Province of Quebec, within a distance of seven miles of the city of Montreal, is situated the manufacturing steel plant of the Armstrong Whitworth Co. of Canada, Ltd., a branch of the famous Sir W. G. Armstrong Whitworth Co., with works located at Elswick, Newcastle-on-Tyne, and at Openshaw, Manchester, England. The English works are presumed to be the second largest in the world, being next to the Krupp's at Essen, and during the late war they employed 80,000 men and 20,000 women in the manufacture of guns, ships, armor plate and munitions.

The Canadian branch of this company was started about 1914, and manufactures a full range of crucible and alloy steels, including carbon, high-speed tool steel, nickel, chrome, etc. They have also a fully equipped machine shop where small tools of all kinds are turned out, including drill cutters, twist drills, reamers, dies, hobs and special forgings.

Before the great war, Canada was obliged to purchase its forged steel car wheels and locomotive tires abroad, mostly from the Krupp Company, but now, due to the foresight of the managing director, M. J. Butler, C.M.G., Canada is now independent of having to import these necessities for her growing railways. Early in 1916 he designed and had installed a complete car wheel and locomotive tire shop, with a capacity of 3000 to 3500 car wheels and the same number of tires per month.

During the latter part of 1916, the Bonnot Co. of Canton, Ohio, was given a contract to install a Holbeck preparing and distributing system to furnish powdered coal to all their heating operations, consisting of rolling mill furnace, the new tire heating furnaces, forging furnaces, two 18-ton open-hearth furnaces, and four boilers consisting of two 500-hp. Babcock & Wilcox, and two 500-hp. water tube boilers as made by the Goldie & McCulloch Co. of Galt, Ont.

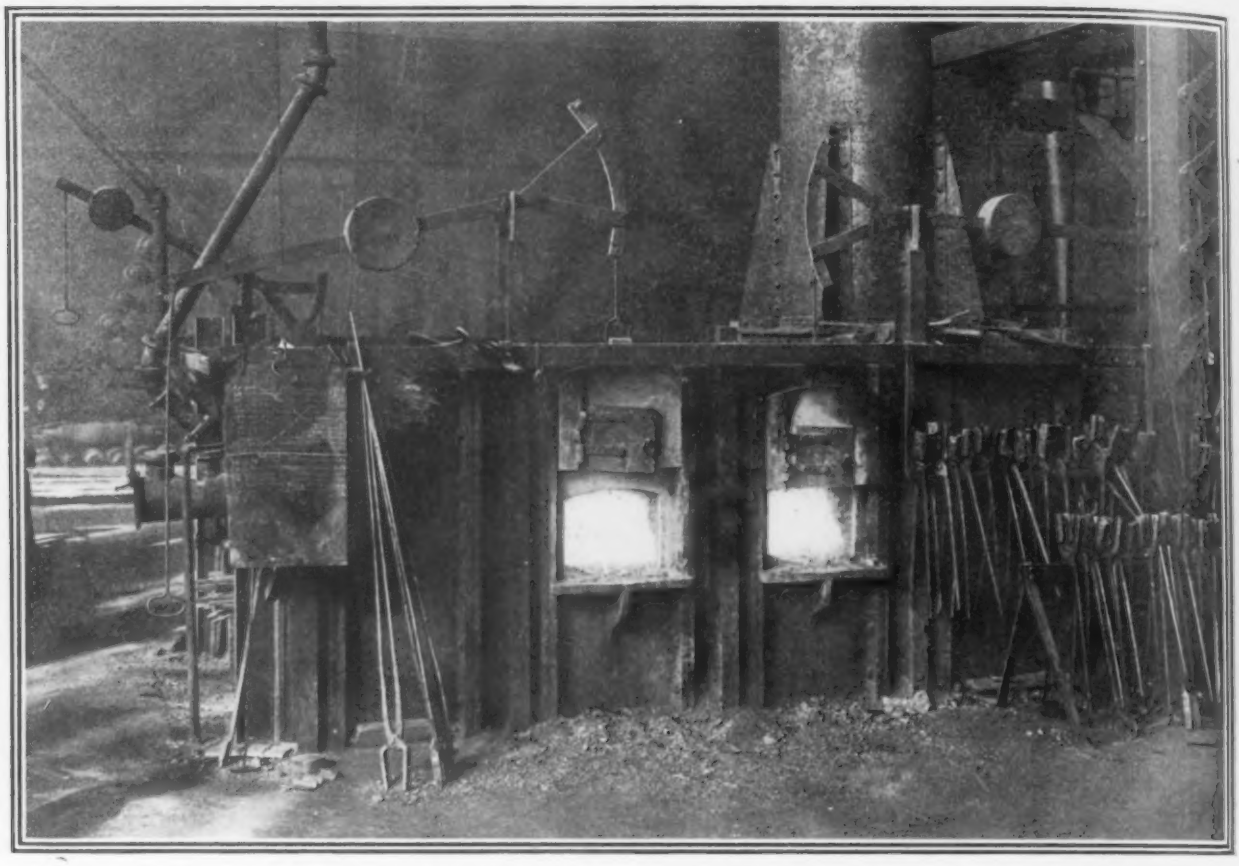
In December, 1917, the Holbeck system was fully installed, with all departments operating on powdered coal. During the past two years this system has proved itself satisfactory as well as economical.

The purpose of this article is to describe the varied application of powdered coal, and to give the results obtained from the furnaces equipped.

The powdered-coal plant is located about 200 ft. from the works proper, and adjacent to a coal storage yard, which in turn is served by a locomotive crane and bucket from a larger coal-storage yard. The coal is first crushed through a single roll crusher to cubes of 1 in., then conveyed by small sections of screw conveyors to a bucket elevator, when it is elevated and discharged into an automatic scale. This scale up to date has registered over 14,000 tons which has passed through into the dryer.

The coal dryer is a single steel shell 4 ft. in diameter and 30 ft. long, driven by a belt connected to a 7½-hp. motor. The dryer, by means of a hand-fired fire on a grate at the discharge end, heats the coal by passing the gases at a low velocity in a counter direction to the flow of coal. There is no loss of coal in this dryer as no exhausters or

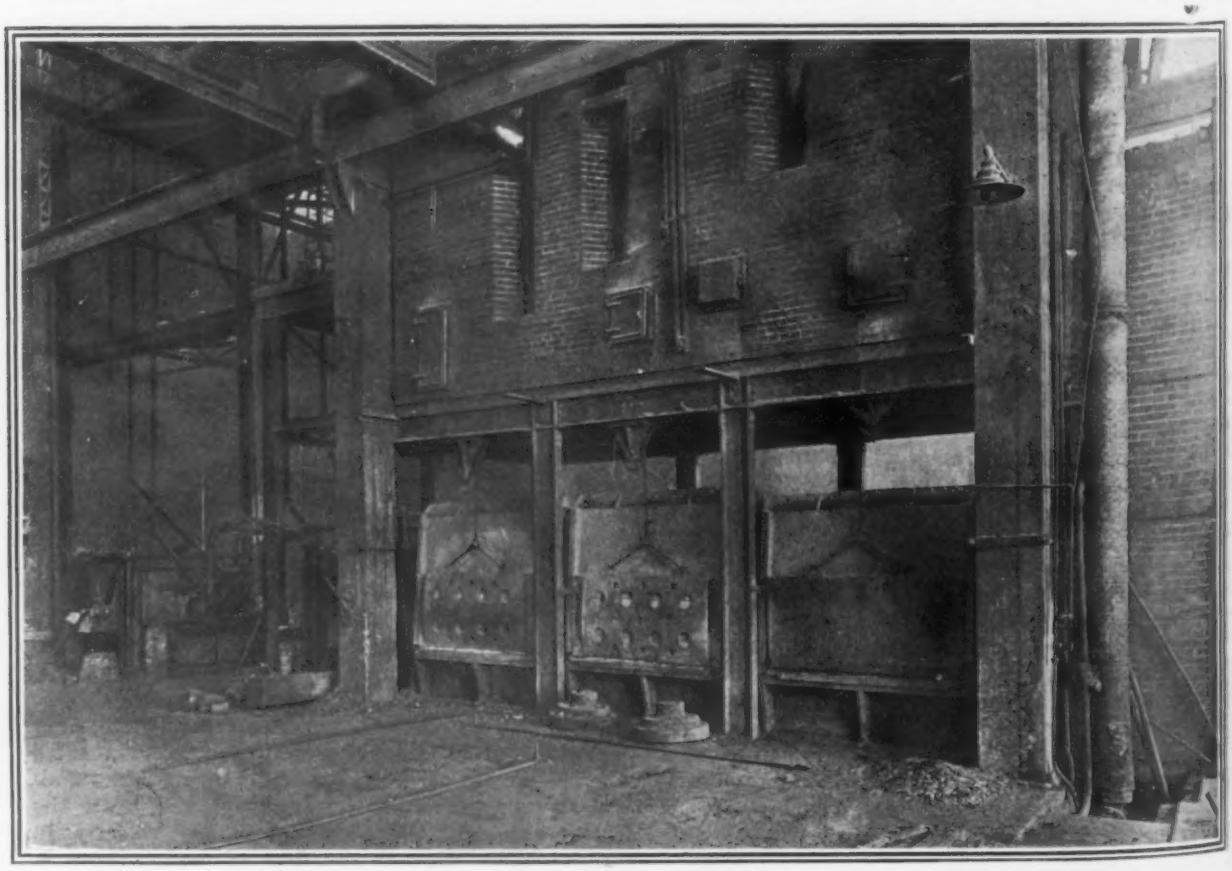
*Mechanical engineer of powdered coal department Bonnot Co., Canton, Ohio.



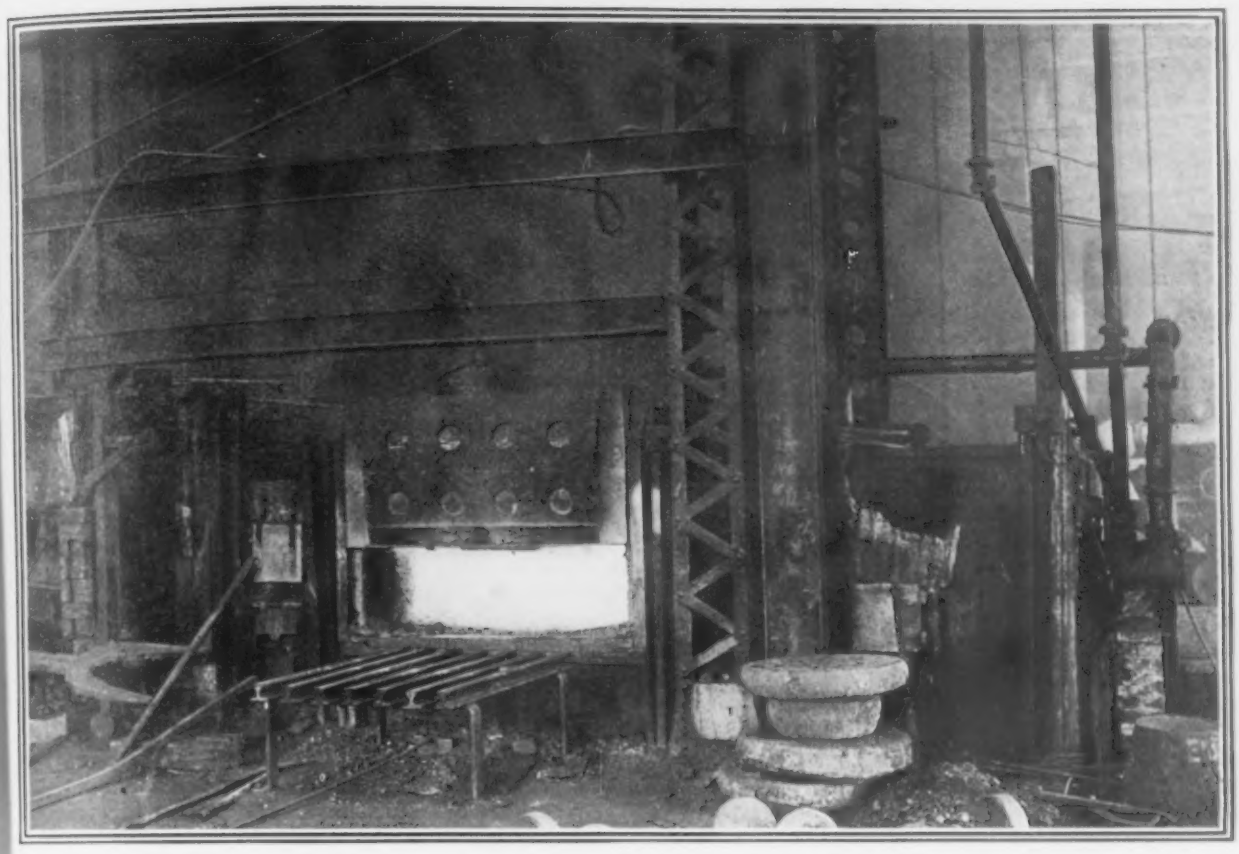
This Furnace in Which High Speed Steel Is Heated Has One Burner Which Consumes About 100 Lb. of Powdered Coal per Hr. The furnace has a heating capacity of 3000 lb. per 12 hr. of pieces 3 x 3 in.

collectors are employed. The dryer has a capacity of five tons of bituminous coal per hr., removing the moisture to less than one per cent.

From the dryer the coal passes through a screw conveyor to two coal bins, each of 1-ton capacity, so arranged that the coal from one bin feeds two 18-in. Bonnot pulverizers of 1¼ ton per hr. capacity, which are complete with vacuum air separators. From the air separators of the pulverizers the coal dust is exhausted by means of cast-iron mill exhausters of the Bonnot type, and discharged into galvanized steel plate collectors placed on top of the



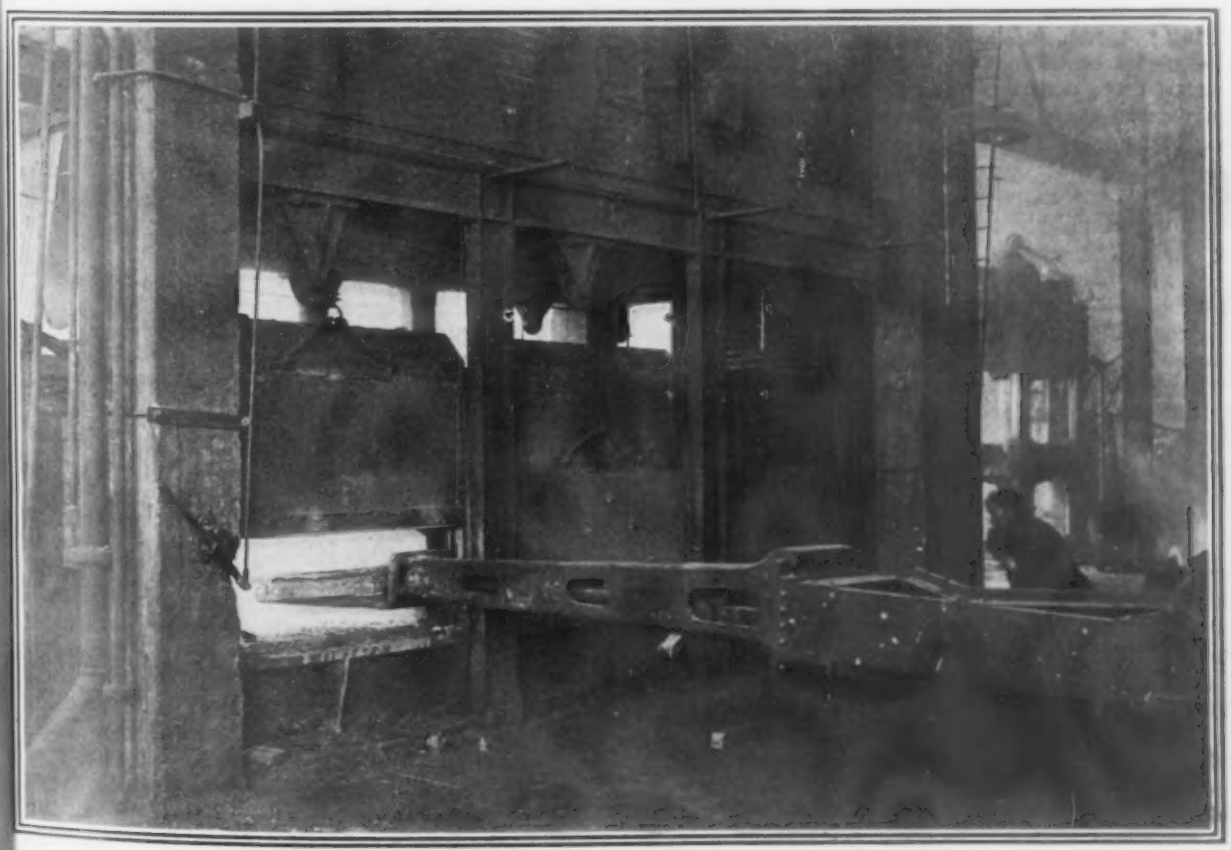
The Ingots After Being Pressed Are Placed in This Single-Door Heating Furnace, Where They Are Heated for 3 Min. Above each of the heating furnaces is a waste heat boiler



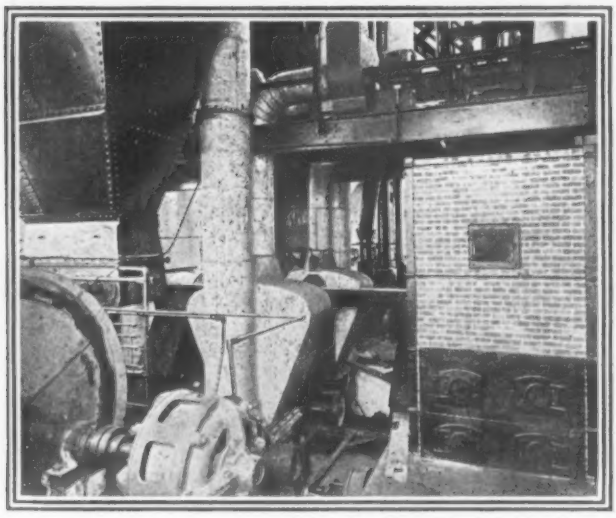
Discharge End of Continuous Furnace in Tire Shop for Heating Ingots. The ingots vary in size having a diameter of 12 in. at the small end and 14 in. at the other end and a depth of 14 in.

two 25-ton powdered-coal storage bins, each pulverizer having its own collector. The return piping from these collectors is carried back to the side of the pulverizers, maintaining a vacuum in the air separator, and at the same time tending to keep the coal plant clean.

The pulverizers are of extra heavy construction with no wearing parts inside the mill that require lubrication, and on account of the air cushioning of the collectors the abrasive action is eliminated. The horizontal drive with two bearings placed outside of the mill, accessible both for adjusting and



The "Bocked" Tires are Placed in This Double-Door Reheating Furnace and Then Taken Out from the Opposite Side and Delivered to the Tire Rolls



Interior of the Powdered Coal Plant with the Furnace End of the Dryer in the Foreground

lubricating permits this pulverizer to operate continuously for a long period.

The two 25-ton powdered coal-storage bins are so arranged that each of the two pulverizers discharges the coal dust into one bin, and by means of two by-pass screw conveyors driven by reversible motors placed under the discharge spouts of the collectors, the coal dust from either of the pulverizers can be deposited into either of the 25-ton storage bins.

Locating the powdered coal bins in the coal plant and away from the high temperatures near the furnaces eliminates the storage of large quantities of powdered coal over the furnaces and reduces the risk of spontaneous combustion to a minimum. Also with this system there is less hazard of spontaneous combustion due to the continued movement of the powdered coal from the top to the bottom of the bin due to the coal being drawn out at the bottom, and that which is not used at the furnaces being returned to the top of the bin. There is the additional advantage of having all of the powdered coal storage available for any or all of the heating furnaces as against separate coal-storage bins at each furnace. This also simplifies the operation of the powdered coal plant which is worked in two 8-hr. shifts, as the extra labor of inspecting and filling each individual bin can be avoided.

From the storage bins the powdered coal is fed by small screws inclosed in wrought-iron pipe, into four distributing blowers and systems, one to the rolling mill furnaces, one to the tire mill furnaces, one to the open-hearth furnaces and one to the boilers. Each system has its separate return line back to the coal plant from the last furnace which it served, and the coal dust which was not used is returned to the storage bins through return line collectors.

The distributing blowers which are used to furnish the necessary air to each distributing system are made of cast-iron throughout, complete with cast-iron pedestal and sub-base for the motor. The scroll is cast in one piece and is made adjustable for any angle. The blast wheel is overhung, having blades made of soft steel, and the bearings are Timken roller bearings. One of the desirable features of these Bonnot blowers is the facility with which the motor pedestal can be slid back with the motor and the blast wheel removed, and replaced without in any way disturbing either the suction or discharge piping. Another desirable feature is the tightness of the side plates and scroll, thereby eliminating leakage of coal dust.

The mixture of the coal dust and air is controlled in the powdered-coal plant by means of an air indicator and regulator. Each system has its separate indicator and regulator, so that the furnace operator can open or close his valves on the coal line at the burners without the necessity of notifying the coal plant operator. The operation is performed as follows:

When a valve on any coal dust branch pipe leading to a powdered-coal burner is opened or closed by the furnace operator, at the same time in the coal plant this difference in pressure caused by opening or closing a valve is felt in the vent line, which has a volume float governor and indicator between it and the suction side of the distributing blower. This float rises or falls as the valve opens or closes, and at the same time by means of the automatic regulator controls the variable speed motor and thus the speed of the screws, feeding the coal dust into the suction side of the blower. By this means the density of the coal dust mixture is at all times the same regardless of the number of furnaces which are operating or idle, the quantity being changed as required.

Another feature in this connection might be mentioned. The mixture that is carried in the distributing mains to the furnaces is not a combustible mixture and will not of itself burn, but, on the contrary, additional air must be furnished at the burner to insure perfect combustion. This secondary air is added at a pressure of 3 to 5 oz. and in the amount of about 150 cu. ft. per lb. of coal to be burned.

The distributing mains are asphalt coated, spiral riveted pipe of standard thickness with bolted joints, and have been found an excellent medium for distributing powdered coal, as the pipe is light yet strong and very easily erected.

One of the illustrations shows a furnace in which high-speed tool steel is heated before being forged under a 1-ton hammer. This furnace has a heating capacity of 3000 lb. per 12-hr. day of 3 x 3-in. pieces, which are forged down to 1½ in. square. There is but one burner on this furnace, and it consumes approximately 100 lb. of powdered coal per hr. The powdered coal gives a fine mellow heat, and no difficulty has been found due to ash being deposited on the work.

In addition to this furnace, there is another forge furnace having one burner, which heats the carbon steel from the 7 x 7-in. electric steel ingots, which are forged under a 3-ton hammer to 4 x 4 in. and 3 x 3 in. bars. The capacity of this furnace, which is called a "cogging" furnace, is 7000 lb. from 7 to 4 in. square, 8000 lb. from 6 to 4 in. or 10,000 lb. from 4 to 3 in. square on the basis of 10 hr. operation. The consumption of powdered coal is also approximately 100 lb. per hr. There is also another furnace heating large forgings for a 500-ton press having a 100-hp. waste heat boiler.

There are three rolling mill furnaces serving 9-in., 12-in. and 20-in. mills, all operating on powdered coal. The tonnage of these furnaces varies so greatly on account of their constant-changing orders that no accurate figures can be given.

In the tire shop the heating process consists of three distinct operations. After getting the ingots from the electric melting furnaces, of which there are one 3-ton and three 6-ton, the disks are delivered in the far end of a continuous furnace. These ingots vary in size according to the diameter of a tire desired, and are not unlike a pear in shape, having a diameter at the small end of 12 in., and 14 in. at the larger end, and a depth of 14 in.

After heating, these ingots are pressed under a 2000-ton press to a thickness of about 7 in., and

then a hole is pressed out about 11 in. in diameter. This operation under the 2000-ton press consumes about 1 to 2 min. The disk is then placed in the single-door reheating furnace, where it is left for 3 min., then taken out and placed on a 600-ton press, where it is "becked" into the shape of a tire. After this operation the tire is placed into a double-door reheating furnace and then taken out from the opposite side of the furnace and delivered to the tire rolls, where it is rolled to the desired diameter. The entire pressing, reheating and rolling operation per tire consumed about 8 min. from the time the disk is taken from the continuous heating furnace until the tire is rolled.

Above each of the reheating furnaces there is a waste heat boiler. These boilers are each a 250-hp. Goldie & McCulloch water tube boiler. An evaporation test was made on these waste heat boilers with the following results:

| | |
|---|---|
| Test started Jan. 15, 1919. | |
| Duration of the trial, hr. | 120 |
| Water evaporated, lb. | 734,400 |
| Hp. per hr. for 2 boilers, hp. | 204 |
| Hp. per hr., one boiler, hp. | 102 |
| Feed water temperature, deg. Fahr. | 175 |

This test covers a 12-hr. turn, from 6 a. m. to 6 p. m., the stack draft being checked a large percentage of the time, and with no additional powdered coal burners being used except those for heating the furnaces. Another test was made where each boiler developed as high as 156 hp., using additional powdered coal for short periods on the boilers.

On Dec. 26, 1918, a test was made on the boilers in the power house to find just how much steam was used in the tire shop, all other departments being shut down that day. The test is as follows:

| | |
|---|---|
| Duration of trial, Dec. 26, 7 a. m. to 6 p. m. | |
| Coal used, lb. | 27,575 |
| Water evaporated, lb. | 330,950 |
| Hp. in 11 hr., hp. | 11,030 |
| Hp. in 1 hr., hp. | 1,003 |
| Tons of coal used, ton | 13¾ |
| Tons of coal used per hr., ton | 1¼ |
| (2½ lb. of coal per hp.) | |

As to the fuel consumption in the tire shop, a test was made with the two reheating furnaces, and it was found that with four burners these two furnaces consumed in 11 hr., 13,980.12 lb. of coal, or 317.73 lb. per burner per hr. In addition, however, there was burned in the hours from 3 a. m. to 7 a. m., to bring the furnace up to desired temperature, 5,083.68 lb. of coal with the four burners on the two furnaces.

The tonnage of these furnaces vary from week to week according to the diameter of tires being made. The tonnage for this particular time was 28 tons in 11 hr., or 2½ tons per hr. This gives a result of 508 lb. of coal burned in the two furnaces with four burners per ton of steel heated, or 254 lb. per ton per furnace. To this should be added 181 lb. of coal burned per ton to bring the furnace up to the desired temperature, which gives a total of 435 lb. of coal burned per ton of steel heated. But in addition to the heating of the steel, there was reclaimed approximately 100 hp. per hr. from the waste gases from each furnace through the waste heat boiler. Also if the furnaces were run on both a day and night turn, the fuel consumption would be lower per ton than is now the case.

The Distributing Mains Leaving the Powered Coal Plant, Which Is to the Right but Not Shown. The two mains dropping into the building at the left are the supply to the boilers and the return line to the coal plant

The waste heat boilers are cleaned out at least once a week, as also are the furnaces of the ash which is deposited on the hearth.

In the main steam plant it is necessary to clean out the tubes by means of a steam jet every 12 hr., taking one man about 30 min. for each boiler. The brick work of the combustion chamber lasts for a period varying from 6 to 9 weeks, when it is repaired, slag cleaned out and a new combustion chamber rebuilt at a cost of approximately $60 for material and labor. However, the design of the combustion chamber is being changed, which it is believed will lengthen the life to at least three to four months, and will make the removal of the slag in small slugs possible.

The writer wishes to thank M. J. Butler, the managing director; Laurence Russel, the assistant general manager, H. Johnson, the general superintendent, and W. N. Watson, superintendent of maintenance, for assistance in preparing this article.

## Compounds in Blast Furnace Bears

A lengthy paper on "Blast Furnace Bears" by Dr. J. E. Stead, delivered at one of the 1918 meetings of the Iron and Steel Institute in London, presented the results of an extended investigation of their character, formation and composition. The chief points of interest regarding these bears were as follows:

Spheroidal form of graphite, probably built up of aggregations of fine laminae.

Proof is given that sulphide of iron and sulphide of manganese crystallize together in many proportions, in mixed crystals or homogeneous solid solutions, and that considerable accumulations of sulphides occur in parts of bears, one of which contained two-thirds of its weight of almost pure MnS.

The discovery of a considerable quantity of a mixture containing about 40 per cent by weight of dark blue cubic crystals, proved by analysis to have a composition approximating to titanium cyanide, $Ti(CN)_3$.

Proof that strongly oxidizing conditions exist in the hearths of blast furnaces, which are sufficient to decarburize completely considerable quantities of the pig metal. The decarburized iron is found in part very coarsely crystalline, yielding cleavage faces on fracturing as large as 1½ to 2 in. across. Other parts are crystallized in columns 6 in. to 8 in. in length, and each column consists of a single ferrite crystal.

The discovery of an immense number of crystals, more or less idiomorphic, of iron phosphide, $Fe_3P$, in the body of the columnar ferrite crystals.

Discovery of independent and idiomorphic crystals of iron phosphide resembling rhabdite in character, together with crystals of iron carbide in a drusy cavity of an Ormesby bear.

Proof, more fully described in a previous paper, that iron-manganese silicon and carbon formed homogeneous idiomorphic crystals of iron-manganese carbo-silicide below the hearth of a Blaina furnace which had been used in the manufacture of ferromanganese.

# ADJUSTING CLAIMS

## Acting Secretary Crowell Tells Contractors No Lawyers Are Needed

WASHINGTON, April 22.—Despite all efforts of the War Department to speed up the work of readjusting and settling contracts uncompleted at the time of the armistice, the cancellation negotiations completed aggregate only a little more than 10 per cent of the financial obligations of the department at the time of the armistice; $375,134,200 out of $3,572,000,000. The suspensions and cancellations total $2,474,939,600—70 per cent of the original contract values.

To speed up the presentation of claims against the department and to hasten the negotiations for settlements, an official announcement has been issued by acting Secretary of War Crowell that contractors need no intermediary organizations or agents to secure prompt action. As Director of Munitions, Mr. Crowell is the president of the War Department Claims Board. The announcement is strongly reminiscent of the repeated statements made a year ago by Bernard M. Baruch, chairman of the War Industries Board, that "no lawyer need apply."

The announcement of Mr. Crowell in part follows:

It is believed that every facility has been afforded contractors for the prompt and efficient determination of their rights as claimants. Every claim, whether under express or implied contract, will receive careful and full consideration, while settlements in every instance will be made as promptly as possible. The War Department, at all times, will give claimants full information concerning the presentation and handling of claims and no one should feel that any information at the disposal of the War Department may be more readily obtained through the intervention of a privately owned organization or agency.

Claimants may apply either personally or in writing to Major Erskine Bains, Recorder of the War Department Claims Board, Room 2402, Munitions Building, Washington, for any information concerning filing of claims against the War Department and this information will be given promptly and in as full detail as possible.

The War Department particularly desires to point out that claims presented direct by contractors will receive exactly the same attention and consideration as those presented through a claims organization or agency.

According to the figures given out by the War Department the value of the chief items of ordnance delivered during the week ended March 27 was only $3,700,000, as compared with a previous low figure of $5,300,000 and $26,000,000 for the week preceding the armistice. The value of ordnance items which it is proposed to complete on war orders had been reduced by deliveries and revision of plans to about $104,000,000 on March 27, as compared with $168,650,000 a month earlier.

Much artillery ammunition is being returned from France. The amount received in the United States from France from the signing of the armistice to March 31 includes the following: 75 mm shrapnel 2,839,500 rounds; 75 mm H. E. shell 924,153 rounds, larger calibers 311,823 rounds. The figures summarizing these returns by tonnage are not yet available for recent months, but the total returned during January amounted to 40,044 net tons, excluding French replacement steel. Of this total 35,177 tons were artillery and small arms ammunition.

## Exportation of Iron Ore or Pig Iron from Sweden

Whether Sweden is to export iron ore or iron was recently discussed by Prof. Gunnar Anderson of the Commercial University of Stockholm, Sweden, in a lecture. His answer to this question is reported to have been as follows: If Sweden manages her affairs wisely and well, her ores will suffice for both purposes. She must push her ores on the world market. Part of the ores should be used for the iron manufacturers of the country itself, and here her efforts should be specially directed to high-quality products, as being the only department where she can expect to compete successfully in the world market. None of the non-phosphoric ores of Bergslagen should be allowed to be exported. The writer hails with satisfaction the fact that several ore fields in central Sweden which had passed into foreign hands have of late returned to Swedish ownership. Modern methods of deep boring have made possible a more exact investigation and computation of the supplies at Bergslagen. Geological investigation has proved the fact that in the course of centuries about one-third of these deposits has been removed, leaving about two-thirds. The latest deep borings give still more favorable results. Exactly the same holds good with regard to the Lapland ores. The enormous stores of ore in Kirunavaara would seem to contain 50 per cent more than was previously estimated.

## A Continental Steel Syndicate

It is reported that negotiations are proceeding in Belgian iron and steel trade circles for the formation of a Belgian steel syndicate, says the London *Iron and Coal Trades Review*. The efforts in this direction are said to be influenced by France, where it is proposed to constitute a binding syndicate in place of the former free and easy associations. Through the concession of the late German Lorraine works to France, and the possible inclusion also of the Saar works within the French sphere of interest, the iron and steel industry of France will experience an enormous increase, especially if the Luxembourg steel industry enters into a community of interests with France, and Belgium also should be included in it.

On the other hand the German steel syndicate will lose its importance through the withdrawal of the s uthwest German and the Luxembourg groups. As a consequence the importance of the steel syndicate as an advanced post for the formation of future international syndicates—beams, rails, etc., as in former and pre-war years—would lapse. It is further stated that if an independent Rhenish Republic is formed, the French are in favor of the inclusion of the works in that region in the present scheme for the constitution of the projected continental steel syndicate.

## Americanization School

The Stanley Works, New Britain, Conn., has granted the establishment of a factory school, which was conceived and planned by the factory Americanization committee. Class sessions are held in working hours and workers are paid their regular day work rate for the time allowed to attend. Five hourly classes meet daily, four for men and one for women. The enrollment is 44 men and 8 women.

School is in session every day except Saturday from 9 to 12 a.m., and from 2 to 4 p.m. The subjects taught are English, reading, penmanship, arithmetic and civics, and the course covers 12 weeks or 60 lessons with a possible advanced course of equal length. The work is under the supervision of E. Newton Smith, secretary of the committee.

## Latin-American Trade

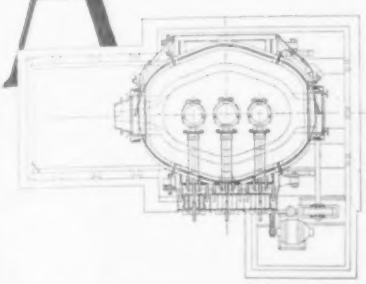
ST. LOUIS, April 17.—That the manufacturers of the United States unite to take advantage of the Webb law for doing business in Latin-America and other foreign countries was one of six recommendations made by John Barrett, Director General of the Pan-American Union, in an address here today before the convention of the Mississippi Valley Waterways Association. Mr. Barrett made the statement that the United States today is buying and selling more with Latin-American countries than all other countries of the world put together. This condition, he said, will not last unless the manufacturers of the United States are alert and, among other things, send men into the Latin-American countries to study the field and establish agencies.

The Fort Dodge Culvert & Iron Mills Co., manufacturer of corrugated metal culverts and road machinery, Fort Dodge, Iowa, has a 10-in. mill which is now operating, producing reinforcing bars, flats, rounds, etc., and also steel posts. The company is now starting to build an open-hearth furnace of 50 tons daily capacity.

# The Vom Baur Electric Steel Furnace

## Details of the First Installation Operating in a Milwaukee Steel Foundry —Its Shape One of the Features

AN electric steel furnace of new design which has recently been put in operation in a Milwaukee steel foundry, has certain features which are claimed to distinguish it from some of the more familiar types. The furnace is known as the Vom Baur electric furnace, named from the inventor, C. H. Vom Baur, vice-president Price Engineering Co., consulting steel plant engineer, Woolworth Building, New York.

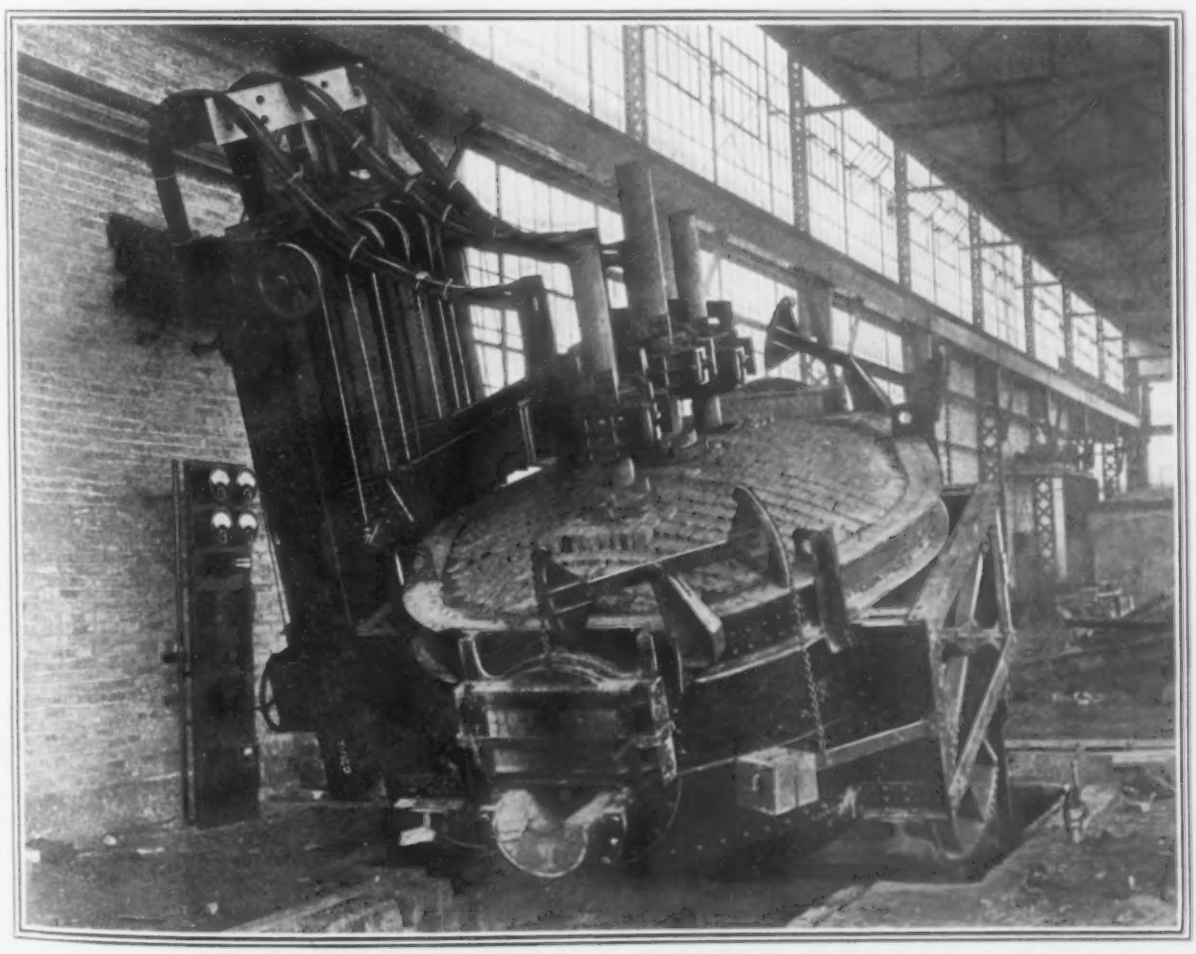


A 6-ton unit of this new furnace was started about Feb. 1, this year, in the new plant of the Hercules Steel Casting Co., Milwaukee. About 100 heats have already been made, mostly on an acid bottom. The furnace is, however, constructed in smaller units. The present operating installation is making castings from 1 lb. up to 1 and 2 tons in weight, the company being a new organization which built a plant late in 1918.

The following details regarding the Vom Baur furnace are furnished by Mr. Vom Baur:

Very soon after electric furnaces in the iron and steel industry were placed in commercial operation in the United States, some 11 years ago, it became evident that one of the limits of its possibilities depended on the life of the refractories. All kinds and types of electric furnaces have to take care of this item much more than any open-hearth furnace. The experience of many electric furnace operators and designers has been of this nature. The simplest refractories of any arc furnace are those of the single phase, single electrode type, with a bottom electrode, when this has a round hearth and the carbon electrode at its center. It is evident that the heat at the inner contour of the side walls and of the slag line of this furnace is the same at any point thereof. Consequently when the side walls burn away they do so equally. That is to say, there are no hot spots on any portion of the side walls or slag line, due to the heat of the arc, and manifestly no portions of the refractories need repairs when properly laid prior to some other portion. As the single phase furnace of any but the smallest sizes is not popular with central station managers, it is seldom seen to-day in the newer installations, polyphase furnaces having almost exclusively taken their place.

At first, on account of the many advantages of the polyphase furnace, compared to the single phase, the refractory feature as above mentioned did not

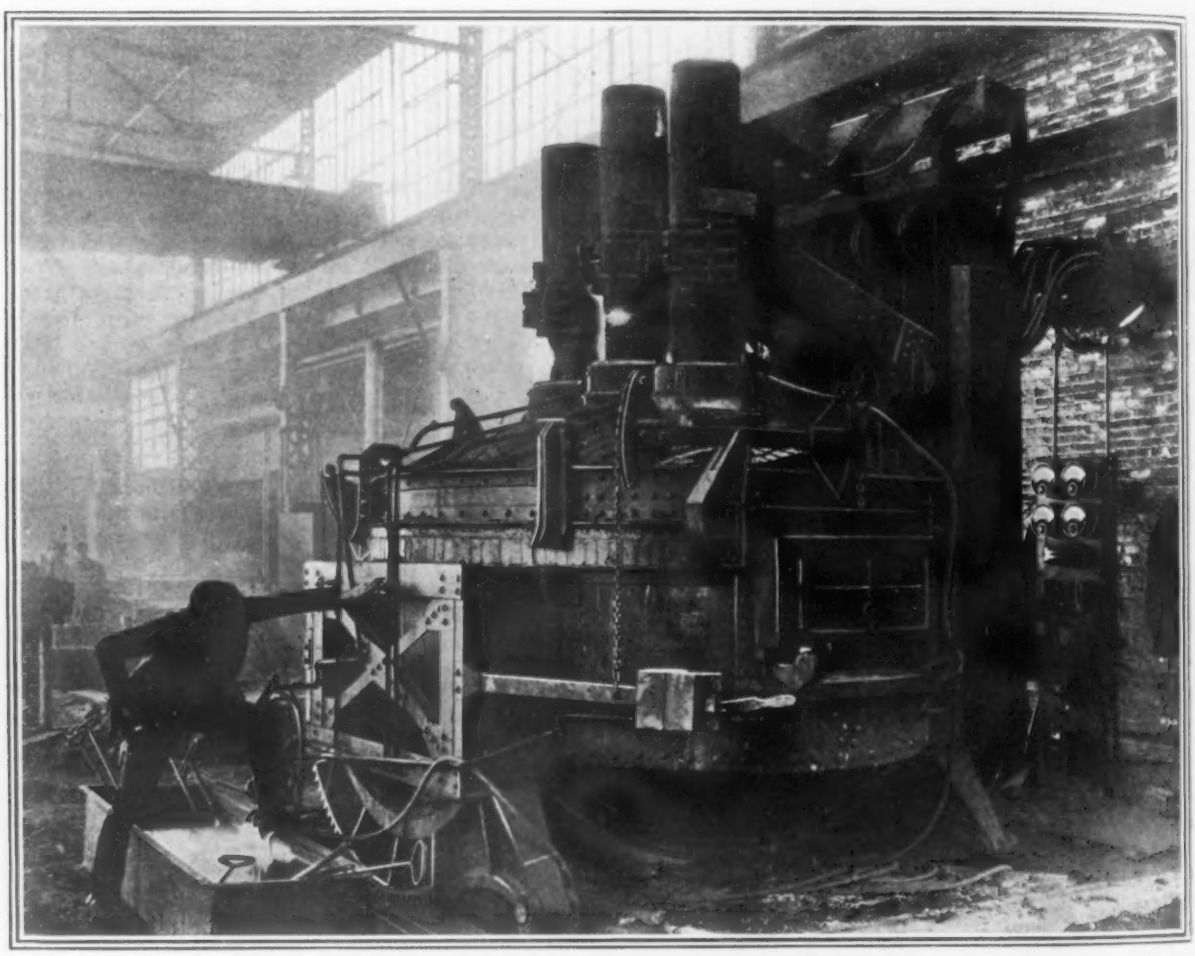


The 6-Ton Vom Baur Electric Furnace at the Hercules Steel Casting Co., Milwaukee, Wis., in Its Tilting Position. The pouring spout end of the furnace is here shown

receive the attention it deserved until the appearance of the Vom Baur electric furnace, which has, with its three electrodes, 3-phase 2-wire, the same good heat distribution as the simple single phase furnace. This good heat distribution in the Vom Baur furnace is accomplished by the combination of placing three electrodes in a straight line. The contour of the inner refractories can easily be ascertained so as to give a curve to the refractories which is correct, so that the heat at the slag line, at the side walls and at the hearth banks is the same, thus assuring among others the equal burning away of all the refractories involved. Only very small allowances from the theoretical have to be made in order to accomplish this purpose.

The shape given to these furnaces is shown by the illustration at the beginning of this article. This shows a well-defined minor axis drawn through the middle electrode, and this shape is the natural result of the radiated heat reaching points on the minor axis from the three electrodes. Theoretically the central electrode would have 41 per cent more heat than either of the end electrodes, but it is not possible to reach this condition practically and maintain the arcs at their best setting. The current at the central electrode is therefore diminished by several per cent. Even so, the heat from the central arc is fully one-third more on an average than from either of the end arcs and consequently, in order to keep the refractories at their proper distances, the metal bath has a larger surface than the furnace would have if each of the electrodes ever gave off an equal amount of heat. With basic operation the advantage is that the metal presents a greater slag area for the same tonnage. As the rate of refining depends not only on the chemical composition of the slag, the heat at the point of contact between the metal and the slag, but also on the amount of surface engaged between the slag and the metal, it follows that the rate of refining is quicker.

There is very little poking to be done in this furnace when melting down cold scrap, as there are no hot or cold spots on the side walls or near the doors. The quick melting down with this furnace, as with all others, depends mostly on the amount of transformer capacity which the furnace has. However, as this furnace has an even heat distribution at the side wall refractories, it is claimed more efficient than the other furnaces which lack this feature. Special attention has been given to the doors, which have water-cooled frames, and which fit very snugly, yet allowing for all expansion, and yet can be tightened after they are closed by giving a few turns to two handles.



Rear View of the Vom Baur 6-Ton Electric Furnace, Showing Charging Door. The electrode holders are so constructed that by means of fillers either graphite or carbon electrodes can be used, one being substituted for the other in about one-half hour

Structurally the furnace is strong, having a rounded and cone-shaped bottom connected with the upper shell, which is a series of curves. This sets on two rocker arms and the whole is tilted by means of connecting rods from suitably geared mechanism in such a way that when the furnace has reached its maximum tilting position and the operating motor should continue to run for any reason, the furnace goes back to its normal position. The tilting mechanism also allows the furnace to tilt slightly backwards some 6 and 7 deg. so that the slag can be taken off at this door instead of from the spout. Both doors are used for charging.

The center of gravity of the furnace is low as the heavy part of the standards are no higher than is needed for the full travel of the arm holding the electrodes, and as these have an upward tilt, the upright standards are still further shortened. For

carrying the copper cables a much lighter structure is used, all of which can be seen from the illustrations. Either carbon or graphite electrodes can be used and changed quickly; either hand or automatic electrode control is furnished. The oval shape and turtle-back construction of the roof makes a strong construction, standard brick being used throughout for the roof construction, excepting a few special electrode bricks.

The electrical connections are exceedingly simple, being merely three sets of cables from the transformers to the electrodes, and no complication on the high-tension side. Electrically the furnace conditions are satisfactory to the central station managers, the power factor being around 90 per cent and the phases not being distorted more than with other arc furnaces. After continued operation it has been observed that the furnace does not bulge at all, this being another indication of the even heat distribution already mentioned.

The furnace is equally well adapted for melting down miscellaneous steel scrap for castings on either acid or basic bottom, selected scrap for quality and tool steels, or for melting down cast iron borings, or the like, or for use with malleable iron.

The furnace is made in sizes from ¼ ton up to 30, and for any electrical condition. Besides this installation in Milwaukee, six others are being installed both here and abroad and the patents for France, Belgium, Italy, Switzerland and Spain have been disposed of to LeFlaive & Co., St. Etienne, France.

## Liberty Motors for Sale

WASHINGTON, April 22.—The War Department is trying to find some one who wants to buy about 20,000 Liberty motors. So far no extensive peace use has been found for these high-power engines. They might be put into racing automobiles, but chiefly they are valuable for aeroplane use, and the department hopes that the day of the commercial exploitation of air transportation will come soon.

To test out the market for the Liberty motor the department has made the following announcement:

"The Sales and Salvage Section of the Army Air Service, will shortly place on sale approximately 1000 Liberty motors. The motors are 12-cylinder Vee type, 5-in. bore, 7-in. stroke, of 400-hp. at 1700 r.p.m. They are equipped with a Delco generator, battery type ignition, two complete distributing units working independently, and with Zenith duplex carbureters of the special Liberty design.

"All motors are new and represent a surplus over and above the anticipated requirements of the air service. Additional technical data and instructions to bidders may be obtained from the Sales and Salvage Section of the Army Air Service, Building "D," Sixth Street and Missouri Avenue, Washington."

During the week ended April 5, 1919, the total Bureau of Aircraft Production obligations were reduced over $4,000,000 making a total of canceled and suspended contracts of $500,679,617 since the armistice, according to a War Department announcement.

Mackintosh, Hemphill & Co., Pittsburgh, builders of engines and rolling mill and steel works equipment, shipped recently a 34-in. two-high blooming mill, together with tables and manipulator, also approach tables and run-out tables to the Lowellville, Ohio, plant of the Sharon Steel Hoop Co. Some time ago the Morgan Construction Co., Worcester, Mass., furnished a five-stand 21-in. Morgan continuous mill to this plant, which is now in operation.

## ORE BILLS DEFEATED

### Minnesota Legislature Adjourns—Extra Session Now Probable

The Minnesota legislature adjourned April 23, and there is some talk now of an extra session, because of the fact that many important measures have not yet been acted on. But no such session is probable. The iron ore interests have cause to congratulate themselves on the fact that no measures seriously objectionable to them have been passed, and the cause of the tonnage super tax on ore is in worse shape than it has been for many years. Many bills attacking some one or another of the interests of iron ore miners were introduced, but the only one that did actually pass was one taxing royalties 5 per cent of their full and true value. This is carefully worded so that it is not a tax payable by the mining operators, although all mineral leases in Minnesota specifically require the payment of all general and special taxes by the lessee, or operator. It was not the desire of the members of the legislature that the mining companies should pay this tax. There is a strong possibility that this tax is illegal, and that the courts will so decide.

One vicious piece of legislation, that establishing a state compensation insurance department, and making insurance under it compulsory to those taking any insurance, and permitting only those to insure themselves to whom the state insurance board might grant such permission, was killed. A bill for the spreading of school taxes evenly over counties, no matter in what districts collected, was lost. It would have been injurious, not only in its immediate application, but in its possibilities for the future. Bills for the division of St. Louis (the iron bearing) county were lost.

The accompanying table on the great iron deposits of the world was submitted to the legislature by D. G. Woodbridge, mining engineer, Duluth, in connection with his argument against the proposed tonnage tax.

*The Great Iron Deposits of the World*

| Location of District | Tonnage | Average Grade of Ore, Iron | Assumed Cost of Mining, etc. | Freights: To Atlantic Coast | Freights: To Valley Points (Note A) | Cost to Furnace per Unit of Iron: Atlantic Coast | Cost to Furnace per Unit of Iron: Valley |
|---|---|---|---|---|---|---|---|
| Brazil | 5,000,000,000 | 68 per cent | $1.00 | $4.00 | $5.60 | $0.073 | $0.097 |
| Newfoundland | 3,500,000,000 | 50 per cent | 1.25 | 1.25 | 2.85 | 0.050 | 0.082 |
| Lake Superior | 2,750,000,000 | 52 per cent | 3.15 | 1.70 | 0.70 | 0.093 | 0.074 |
| Sweden | 2,200,000,000 | 57 per cent | 2.00 | 2.00 | 3.60 | 0.071 | 0.095 |
| Northern Cuba | 3,000,000,000 (B) | 36 per cent | 2.00 | 0.90 | 2.50 | 0.058 | 0.090 |
| New York and New Jersey | 2,500,000,000 (B) | 35 per cent | 2.50 | 1.00 | 2.60 | 0.061 | 0.089 |
| Alabama | 1,750,000,000 (C) | 36 per cent | 1.00 | 0.25 | 2.75 | 0.035 | 0.105 |
| Norway | 500,000,000 (B) | 35 per cent | 2.50 | 2.00 | 3.60 | 0.075 | 0.102 |

Under head of "Assumed Costs of Mining, etc.," figures are in part necessarily assumed, as in Brazil. For Newfoundland they are based on results. For Lake Superior the $3.15 average is because 50 per cent of Lake ore has averaged $2.90 in cost at Lake Erie for past 6 years, and knowing that this 50 per cent has lesser royalties and greater steam shovel proportion than on the remainder, I assume the remainder costs 50c. more per ton, giving the $3.15 average.

(A) Freights and dock charges to Valley points from seaboard are assumed at $1.60. There is no rate, but the assumption is based on a set of some 25 rail rates covering iron ore movement in the United States.

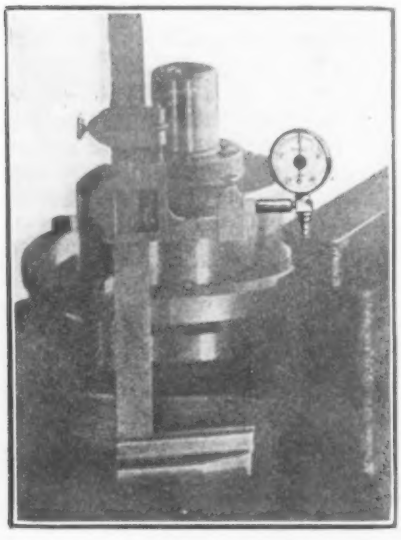
(B) The cost of ore to furnace is figured, not against crude analyses, but against an average iron content in concentrate produced.

(C) Alabama ores are smelted at the furnaces, and the figure of 25c. in column of "Freights to Atlantic Coast" is merely the switching and delivery charge from mine to furnace. To this should be added freight on product to the sea, to complete this comparison.

All the above figures are based on fairly normal conditions, both as to freights and mining costs, and are not to be considered as representing present conditions, except for tonnages and grades. It is exceedingly difficult to give a figure on freights from Brazil, as no iron ore has yet been shipped from that country. The figures given for other points represent perhaps subnormal conditions in the ocean tonnage markets, but they are figures that are likely to return in the course of a few years.

## Dial Test Indicator

The dial test indicator illustrated is manufactured by the Cornell Tool Co., Detroit. The indicators are made in two sizes. No. 1 for tool room use will indicate 0.135 in., and No. 2 for production use will indicate 0.235 in. The dial works on a universal joint, so as to enable the operator to always have the dial facing him.



Dial Test Indicator Used as a Height Gage

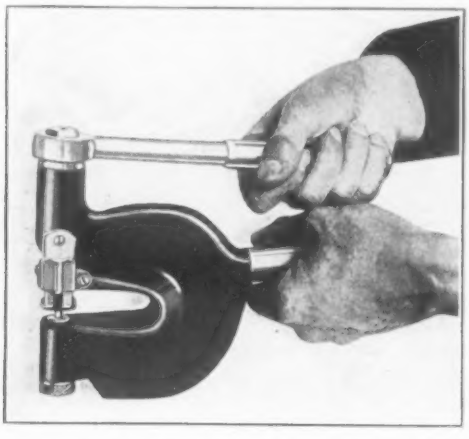
A number of attachments are furnished with the indicator, one of which enables the operator to use the dial with a height gage, the other indicates the bore of as small a dimension as ⅜ in. and to a depth of 8 in. The No. 1 indicator is graduated in thousandths of an inch with the spacings comparatively far apart so as to enable the operator to make a reading easier in a darkened place; on the No. 2 indicator the graduations are ⅛ in. apart.

The F. Conley Co., 502 Book Building, Detroit, are distributors.

## A New Hand Punch

Paul W. Koch & Co., Chicago, are distributers of a new hand punch, here illustrated. The tool is 9½ in. long, weighs 5 lb., and punches holes 5/32, 3/16, 7/32 and ¼ in. in diameter, in metal up to No. 10 gage. It has a deep throat and a one-piece automatic, disappearing stripper, giving a clear view of the punch and the punch mark. Several sheets may be punched at one time and, it is asserted, no twists or turns will be experienced in operation.

A half-turn of the lever will drive the punch through metal. The punches are crowned and of the floating type, directing the power to center. The punches and dies are easily changed and, if desired, the entire tool may be clamped in a vise. The handle is located above the center, thereby keeping the punch naturally upright. The punch is called the Jiffy.

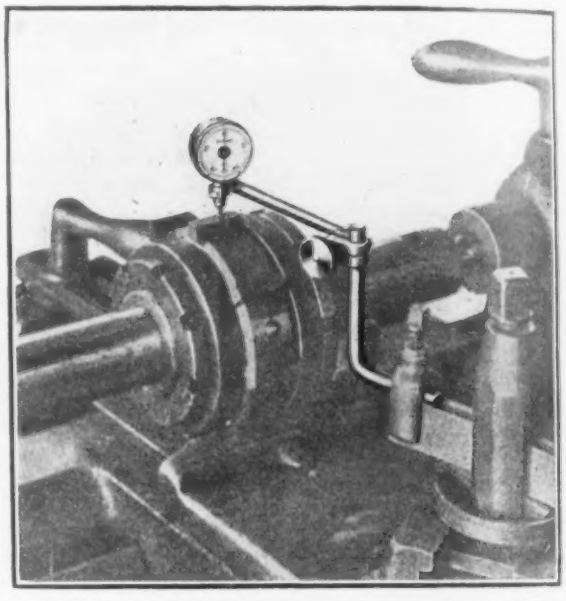


New Hand Punch for Punching Holes 5/32 to ¼ In. in Sheet Metal up to No. 10 Gage

Davis & Sherer Co., Dayton, Ohio, manufacturer of steel parts for filing cabinets and devices, has increased its capital stock from $15,000 to $50,000.

## Booklet on Personal Management

A 60-page booklet, entitled "Personnel Management—Topical Outline and Bibliography," dated January, 1919, should prove of interest to employment and personnel managers of industries, and to all students of labor problems. It contains lists of approximately 1000 books, pamphlets, and magazine articles pertaining to this subject, the topics being so classified as to be readily found. Names of publishers, and where possible the prices of the books are given. Under "Topical Outline of Personnel Management" are 14 sub-topics dealing with: the industrial background of to-day, the personnel manager, the labor turnover, the labor supply, the analysis of the worker, job analysis and personnel specifications, industrial training and education, following up employees after assignment, promotion and transfer, wages, conditions of labor, industrial relations, protection of labor, and community conditions. The booklet was prepared by John J. Coss, lieutenant-colonel, and Leonard Outhwaite, both of the Classification Division, Adjutant General's office, Washington, D. C.



Dial of the Cornell Indicator Works on a Universal Joint So That It May be Turned to Face the Operator

The Rivett Lathe & Grinder Co., manufacturer of precision tools, Boston, has announced the appointment of the following exclusive sales agencies for its products: New York district, western Connecticut and northern New Jersey, Patterson, Gottfried & Hunter, Inc., 211 Center Street, New York; all of New York state except that closely adjacent to New York City, Homer Strong, 301 State Street, Rochester, N. Y.; eastern Pennsylvania, southern New Jersey and Delaware and Maryland, D. Nast Machinery Co., Bourse Building, Philadelphia; lower peninsula of Michigan, J. R. Stone Tool & Supply Co., 997 Woodward Avenue, Detroit.

Holcroft & Co., contracting engineers, Detroit, have completed the installation of 12 large core ovens for the Nash Motors Co., Kenosha, Wis., 15 at the International Harvester tractor plant, Chicago, while 30 more are being built for Wilson Foundry & Machine Co., Pontiac, Mich., 32 for Central Foundry Co., division General Motors Co., Saginaw, Mich.; two batteries of core ovens and 14 large annealing furnaces at the Saginaw Malleable Iron Co.; batteries of ovens for Atlas Foundry Co. and D. J. Ryan Foundry Co., Detroit, and a 20-ton open-hearth furnace for the Monarch Steel Castings Co., Detroit.

The West Penn Power Co., Pittsburgh, has placed an order for a 100-ton electric crane with the Cleveland Crane & Engineering Co., Cleveland, to be installed at its plant at Springdale, Pa.

# Italy's War Buying of American Steel

## A Total of 1,250,000 Tons, Including Pig Iron —Prospects for Italian Iron and Steel Industry and for Trade with the United States

BY LIEUT. ERNESTO D'AMICO*

HE who states that America's contribution at the Italian front has been limited to a regiment of infantry and a few Red Cross units is greatly mistaken, because if not with man power, America has contributed to the splendid victories on the Italian front with equally powerful means, namely, with hundreds of thousands of tons of steel and numberless other varieties of products put out by her gigantic industry.

Italy, needless to say here, is a country not favored by nature in the possession of raw materials, and for this reason must depend upon foreign markets to supply the deficiency. Before the war, Germany was taking excellent care of Italy's needs along this line at prices kept down as low as possible in order to prevent the competition of other countries.

### Italy Not Equipped for War

When the war broke out in August, 1914, Italy found herself in a critical situation. Germany was compelled to cut down the quantities to have been supplied to Italy, while the other foreign countries had necessarily to consider themselves, having barely sufficient to cover their own pressing needs. In spite of this fact, and notwithstanding that the war promised to become longer and more bitter, Italy in the month of May, 1915, prompted by the high motives well-known to all, with very small means at her command, but with the highest degree of enthusiasm, entered into the fight, defying Austria, so strongly prepared for warfare.

The glorious but unfortunate offensives of the Somme and the Isonzo made quickly apparent to the Allies that victory could not be obtained without long, bitter and strenuous exertions and that the new tactics of war would require enormous waste of artillery, shells and aeroplanes. The requirement of metallic materials increased fivefold. Italy promptly prepared for the erection of new and large war plants, new crews were organized and trained and existent arsenals were enlarged. The raw materials would have to be furnished partly by England and France but mostly by America. And America responded readily to the request; the huge quantities of materials ordered by Italy were delivered with promptitude and exactness.

### American Shipments to Italy

We have not yet statistical data of the shipment to Italy of metallic materials since this information is still considered as forming part of the so-called "secreti di guerra" but we are not far from the truth when we state that the following quantities were shipped from America to Italy during the last three years of war:

| | |
|---|---|
| Pig iron | 350,000 tons |
| Scrap | 150,000 tons |
| Billets and blooms | 200,000 tons |
| Steel plates | 120,000 tons |
| Wire rods and wire products | 180,000 tons |
| Steel bars | 250,000 tons |
| | 1,250,000 tons |

It will be observed that Italy to cover her steel needs purchased half of the quantity in raw materials and half in semi-finished materials, rather than limiting herself to the exclusive purchase of raw materials (pig iron, steel scrap) or finished products (steel bars, shells, plates and wire). Most likely the Italian Government would have preferred to acquire pig iron and steel scrap exclusively to manufacture in Italy into finished products, and this for various reasons, the least not being that Italy has plants sufficiently powerful and well-equipped to produce great quantities of unfinished and rolled steel. This wish, however, could not be realized because of the scarcity of coal which is necessary to effect the transformation of raw materials into finished products and this lack of coal was due to the limited export from England, and also and more especially to the continual destruction of ships by the submarines. Nor could Italy limit herself to purchasing purely finished or semi-finished steel. If the prices of these American products had not gone to such high levels Italy would probably have imported from America a higher percentage of finished products, as steel bars, forgings, barbed wire, plates, shapes, etc., for the purpose of economizing on transports and avoiding a larger import of coal. However, in view of the fact that the manufacturing cost in Italy was considerably less and the necessary installations being already there, and also that the well-trained Italian labor produced with more accuracy the complicated war instruments, it is easily understood why the Italian Government adopted the policy of limiting the purchases of finished materials to those absolutely needed. There were probably also reasons of prudence which discouraged heavy purchases of finished products, since it was rather dangerous and costly to trust the precious cargoes to the seas, rendered even more untrustworthy by the submarines. A ship lost with a cargo of 4000 tons of pig iron would have meant a minor damage compared with the loss of a ship containing a cargo of 4000 tons of finished shells. Besides, a cargo of pig iron or scrap steel lost at sea could have been more easily and promptly replaced than a cargo of rolled or finished shells.

### Italy's Experience with American Steel

We have no direct information as to the reception given in Italy to the American steel products but there is no doubt that they have been found not inferior to those supplied by the German industry before the war, although some little defects have been found in the finishing, in the packing and in the sizes of the material. This is perhaps mainly due to the forced rapidity of the deliveries and to the enormous amount of work incumbent upon the American mills which could not allow any too much time to take care of all the details. On the other hand, the Italians are rather exacting in their requirements and in this have been spoiled by the proverbial German precision.

While the American manufacturer is now sufficiently well posted regarding the Italian market, he should have borne in mind that the Italian consumer must be satisfied in his minor requirements. The experience might have perhaps been a little costly at first, but eventually it would have resulted most advantageously.

Italy as well as France usually ordered her materials in metrical sizes. Contrary to the expectation of the American manufacturers, this departure from their custom did not cause inconvenience and all proceeded

*Italian Military Mission to the United States.

fairly well. If the Americans intend to compete in European markets in the future, it would be necessary that they gradually adapt themselves to the furnishing of decimal measurements.

From this side there was a prompt and generous response to Italy's appeal for war materials and this has paved the way for the replacement of German products by those of the United States. The close connections between America and Italy during the war have been instrumental in making American products, manufacturing systems and sales methods well appreciated and admired by Italy and now the road is wide open for those who possess initiative.

### Italy's Industrial Importance

While the war has given opportunity to the Italian industry to know and esteem adequately the American products and through the Governmental missions and numerous experts to observe closely the marvelous efforts made by the American manufacturers, the latter have not yet an exact conception of the importance of the place taken by Italy in the industrial world. Before the war the Italian production of pig iron and of steel was almost negligible: it has since actually doubled, trebled, quadrupled and there is at present a strong likelihood of even greater increase. Now that the demands for necessities of war are diminished, the American manufacturer should go to Italy not only to admire her artistic and natural beauties, but also to establish connections with the Italian industry, miracle of organization and ingenuity. Perhaps not to every one is it known that the lack of coal has compelled Italy to dedicate to the problem of electrical furnaces for the production of pig iron and steel, all that attention which was not sufficiently given to the subject during peace time. Thanks to the electric furnaces, Italy during the war was able to produce special and common steels at prices which were somewhat lower than those charged for steel made with the common type of furnaces. Now that peace is here, Italy is bravely preparing herself to experiment with new problems such as the electro-metallurgical treatment of iron ores in Aosta Valleys, a locality about 200 miles away from the coast and entirely lacking in fuel.

Also to this now growing industry of the steel produced by means of electric furnaces, America has contributed an important share, delivering a great part of the necessary graphite and carbon electrodes.

### Italian Buying in United States

Austria has been annihilated by the valor of Italy and of the Allies, but, as already stated, victory has only been possible with the aid of the inexhaustible resources of the great America. Practically every industrial product has been purchased by Italy in America in proportions more or less large; coal, pig iron, finished and unfinished steel, copper and copper alloys, spelter, nickel, antimony, phosphorus, cotton, explosives, chemical products, foodstuffs, clothing, horses, etc. Most of the imports of Italy during the war consisted of metallic materials, which after conversion in Italy into war instruments, have beaten the enemy.

The Italian purchases in America have been made at different periods with different methods: by private firms, by Government agents or through the Federal authorities. While during the first months of the war the purchases were not conducted with rational systems, owing to the mutual competition of the various countries and to the hostile activities of Germany's agents in the United States, toward the middle of 1916 more concrete methods of buying were introduced and the business of purchasing was put into the hands of the Government's civil and military commission, until during 1917 the valuable help of the Inter-Allied Purchasing Commission and other Federal organizations brought into systematic connection and perfect co-operation the whole machinery for buying.

### Seven Italian Buying Agencies

The Italian purchases abroad were exclusively made by the Government which had instituted in the various countries several different agencies, mostly military missions. There were missions in France, England, Spain, Russia, Sweden and America. In the last named country the Italian high commissioner supervised the work of the following agencies:

**Italian Military Mission for Arms and Ammunitions:** This superintended the purchasing of all materials for the army from shells and explosives down to horses and equipments.

**Italian Military Mission for Aeronautics:** Took charge of buying such materials as were required by the Italian Aeronautical Department, such as lumber, aluminum, special steels, etc.

**Italian Mission for the Italian Navy:** Acquired special machinery, plates, motors, submarines, submarine chasers, etc.

**Italian Food Administration:** Bought foodstuffs of all kinds.

**Italian State Railways:** Bought locomotives, railroad cars, boilers, rails and railroad equipment.

**Italian Ministry of Shipping:** Arranged for the transportation of all the materials purchased.

**Italian Tobacco Regie:** Purchased tobacco.

Besides these Government missions there were agencies for big Italian industrial firms such as Gio. Ansaldo & Co., Ilva, Breda and the Fiat Co., which supervised the enormous purchases made in America in behalf of their firms.

From what has already been set forth, it is easy to understand the importance Italy attached to the American market, from which she drew certainly not less than three-fourths of her needs.

### After-War Trade

It is logical and desirable that the ties which have kept together Italy and America during the strenuous years of war should continue also during peace time and that there may be close co-operation in the commercial and industrial fields. While manufacturers have great confidence in the economic and industrial development of Italy, on the other side Italy looks to America to obtain such financial aid as will enable her to get on her feet.

Italy's export to America of steel and metallic materials during the war has been nil and before the war it amounted to very little. However, it is not improbable that in a future not far distant we shall see in America some products of the Italian industry, not with the idea of aggressive competition, but with the sole aim of acquainting the people of the United States with what the young and sturdy Italy is in a position to do industrially; and surely American fairness will appreciate the spirit of the Italian initiative.

### Status of Italian Contracts in the United States

When the armistice was signed so suddenly, Italy found herself in a rather favorable situation as compared with the other Allied powers in regard to war contracts placed in America. In fact, while the arrangements for placing large steel orders in view of the big drive planned for the spring of 1919 were suspended, little or no trouble has attended the settlement of the then existing contracts, because in the main they consisted of materials easily employable for commercial purposes. With fairness and promptness the American manufacturers with whom Italy had placed contracts for purely war materials (as shells, barbed wire, etc.) agreed to the substitution of commercial material. As to the material which could no longer be used in Italy on account of the cessation of hostilities, most of it was

sold in order to utilize the shipping space for the forwarding of foodstuffs and other cargoes which were more urgently required by the Italian population.

Since last November Italy has purchased but a small quantity of material from America and her ports are practically closed to any import of steel and metals, the Government wishing to dispose of large high-priced stocks which have accumulated during the war. Furthermore, the lack of shipping and the high rate of exchange make very difficult the development of any oceanic transaction.

Very recently Italian newspapers circulated the statement that Italy will need to import during the next twelve months not less than 13,500,000 tons of raw materials from foreign countries and it was intimated that preliminary steps were being taken for the financing and shipping of such purchase. Should this report be true and if America will show toward Italy during peace time the same generous spirit which animated her during the war, there is no doubt that the greater part of the amount mentioned will be placed in this country.

## FOREIGN TRADE GROWS

### Record-Breaking Total—Censorship Being Lifted —Embargoes Removed

WASHINGTON, April 22.—The foreign trade of the United States is still growing. For the nine months ending with March the combined imports and exports have reached the record-breaking total of $7,192,000,000, of which $2,790,000,000 represents the balance of trade in our favor.

Exports and imports both showed an increase in March, according to the figures of the Bureau of Foreign and Domestic Commerce, Department of Commerce.

Exports for March were valued at $605,000,000, as compared with $588,000,000 in February and $523,000,000 for March of the previous year. For the nine months ended with March the exports were valued at $4,991,000,000, an increase of approximately $600,000,000 over the corresponding period of the preceding year.

Imports for March totaled $268,000,000, as against $235,000,000 for February of this year and $242,000,000 for March of last year. For the nine months ended with March the value of merchandise imported into this country was $2,201,000,000, as compared with $2,083,000,000 for a similar period of the preceding year.

The War Trade Board has announced that the many relaxations which have been made in the export and import regulations of the board since the armistice and the recent changes and reductions in the enemy trading list have made it possible that applications for export and import licenses may now be considered favorably which in the past it has been necessary to refuse.

#### Relaxation of Censorship

Another item of news that is highly important to our foreign trade relations is the relaxation of censorship as far as the United States is concerned. European governments still maintain a censorship over American mail and cablegrams passing through their hands, but England has promised to lighten these restrictions as far as that government is concerned.

As a result of the changes in censorship announced by our Navy Department persons in the United States or any of its possessions may now cable without any interference whatsoever by United States censorship to points in Central or South America and the West Indies, including Mexico and Cuba. For instance, cablegrams in private code are permitted from Chicago to Valparaiso, or from Havana to Honolulu, or from New York to Mexico City. The United States has also stopped censoring cablegrams to or from points within British, French or Italian territory, irrespective of the route or other terminus of such cablegram; likewise cablegrams between all parts of the world and Central or South America are not censored by the United States; and in addition cablegrams to and from the Far East, excepting only those to or through Vladivostok, are no longer subject to United States censorship.

"The British Government has not yet decided whether it will permit cablegrams in private code between the United States and South America to pass via London, but it is hoped that a decision will soon be reached."

#### Embargoes Lifted

Ambassador Davis has cabled from London that the British Government has relaxed its export embargoes on engines for use on board ships, including Diesel and other combustion engines for marine propulsion, and component parts thereof; iron and steel castings and forging for hulls and machinery for ships; machinery for steamships and component parts thereof; ships' auxiliary machinery; ships' telegraph apparatus and component parts; steering gear and component parts; winches and windlasses.

### Japan Needs Protection

WASHINGTON, April 22.—Japan's iron industry, which grew rapidly under war stimulus, now needs protection against foreign competition. Both a protective tariff and a Government subsidy are being discussed.

"Representatives of the Japanese iron producers have recently gone to Tokyo in order to obtain from the Diet now in session some measures for their relief," says an article in the Japan Chronicle, transmitted by Consul General George H. Seidmore, Yokohama. "The Government is reported to be considering the situation chiefly from the point of view of national defense, and now declares that any restriction on the import of iron is but a temporary step and is not sufficient to permanently relieve producers of their difficulties. To impose a heavy customs duty on imported iron will, the Government fears, only result in raising the market price (which is exactly what the iron dealers want), with the result that costs of manufacture will be increased and exports of Japanese goods hindered, while many articles made for home consumption will become so dear that there will be an increase in imports.

"There is no alternative, according to the alleged official view, but that a radical measure should be taken by which the Government will unite the iron producers into a large company, with the object of reducing costs of production. The Government also has it under contemplation, it is said, to afford some protection both by imposition of customs duty and by a reasonable subsidy to the iron industry, which will enable Japan to compete with foreign iron. This will aid the producers, but it will not help the importers much, except by minimizing the losses on their present contracts."

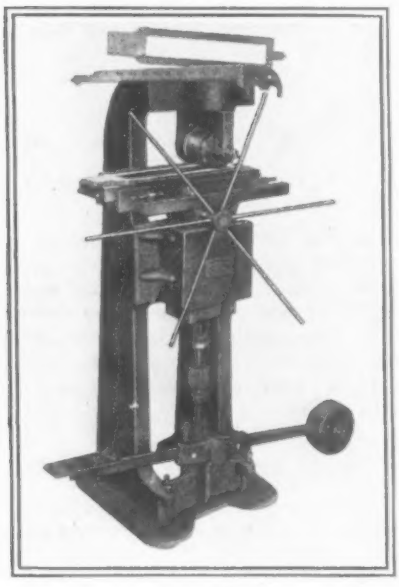
### Sullivan Company Organizes for Foreign Trade

The Sullivan Machinery Co., Chicago, which recently organized a foreign trade department with F. W. Copeland, as manager, has branch offices at London, Salisbury House; at Paris, 18 Avenue Parmentier; at Santiago, Chile, Casilla No. 27; and at Sydney, New South Wales, Australasia, Chambers, Martin Place. Engineering agencies handle Sullivan products in Christiania, Norway; Amsterdam, Holland; Gijon, Spain; Turin, Italy; Algiers; Tunis; Johannesburg and Durban, South Africa; Shanghai, China; Tokio, Japan; Lima, Peru; and Buenos Aires, Argentina.

The recently organized Alloy Metal Wire Co., Inc., has leased the two-story factory building at Nos. 10 and 12 Woodworth Avenue, Yonkers, N. Y., for a term of years for the manufacture of electrical resistance wire, pure nickel, Monel metal, spark plug wire, bronze, brass and copper. S. A. Murray, its president and general mill manager, was, until recently, engaged as wire mill superintendent for the Electrical Alloy Co., Morristown, N. J., and prior to that time was employed in a like capacity for the Driver-Harris Co., Harrison, N. J.

## Special Marking Machine

A machine for impressing graduations and figures on scale beams and other long work has recently been added to its line of marking machines by the Noble & Westbrook Mfg. Co., Hartford, Conn.



Machine for Graduating Scale Beams or Similar Work

The piece of work is held on the table by a suitable fixture and is marked by a cylindrical die, which is carried in a yoke or holder and is rotated by a gear and rack. The marking operation is controlled by foot pressure applied through a lever and cam which is adjustable to regulate the depth of the impression to 0.001 in.

Two samples of work graduated on one of these machines are shown in the accompanying illustration.

## Manganese in January and February

The March report of mineral investigators of the United States Bureau of Mines contains this following information regarding the manganese market as contributed by W. R. Crane:

The production of ferromanganese for January and February was 21,331 and 21,796 gross tons of 70 to 80 per cent material. The production of spiegeleisen was 11,456 and 6309 gross tons of 16 to 22 per cent alloy.

Imports of manganese ore were as follows in gross tons:

| | January | February |
|---|---|---|
| Argentina | ..... | 1,950 |
| Australia | .... | 440 |
| Brazil | 32,352 | 5,450 |
| Canada | ..... | ..... |
| Chile | 441 | ..... |
| Cuba | 10,051 | 11,619 |
| Ecuador | ..... | 20 |
| Japan | 51 | 2,240 |
| Mexico | 609 | 100 |
| Total | 47,504 | 21,819 |

The imports for February show a decline of 25,683 tons from January and an increase of 395 tons over December receipts. Imports for the first fifteen days of March were as follows, gross tons: Argentina, 355; Brazil, 19,391; Cuba, 480; Japan, 25, and Mexico, 216. With the decline in importation of manganese ore there has been, as previously noted, a resumption in purchases of domestic ores.

During February ferromanganese was imported as follows, gross tons: England, 2590; Cuba, 30. Exports included only 66 tons, sent to Canada. The imports for February showed an increase of 1770 tons over January and 2442 tons over the December receipts. The imports for the first 15 days of March were 3461 gross tons, all from England.

## Moore Electric Furnace Installation

The installation by the Farrell-Cheek Steel Foundry Co., Sandusky, Ohio, of a Pittsburgh Moore electric furnace has been completed, and is operating. The installation has a capacity of three tons scrap and requires approximately 1 hr. 40 min. per heat at a power factor of 82 per cent, with a current consumption of 600 kw. hr. The operation of the electrodes is automatic, and are operated by three small motors through relays. Power is furnished by the Sandusky Gas & Electric Co. at 6600 volts pressure through 2300-6600 volt General Electric step-up transformers. The load has been carried on a 750 kw. (old rating) Westinghouse-Parsons turbine, which handles the fluctuations nicely. Between 35 and 40 heats have been made and five heats are run off in 10 hr., including re-charging and cleaning. The Farrell-Cheek Foundry are considering the installation of another electric furnace unit.

## Associated Industries of Missouri

The Associated Industries of Missouri has been patterned after the Illinois Manufacturers' Association, and similar associations.

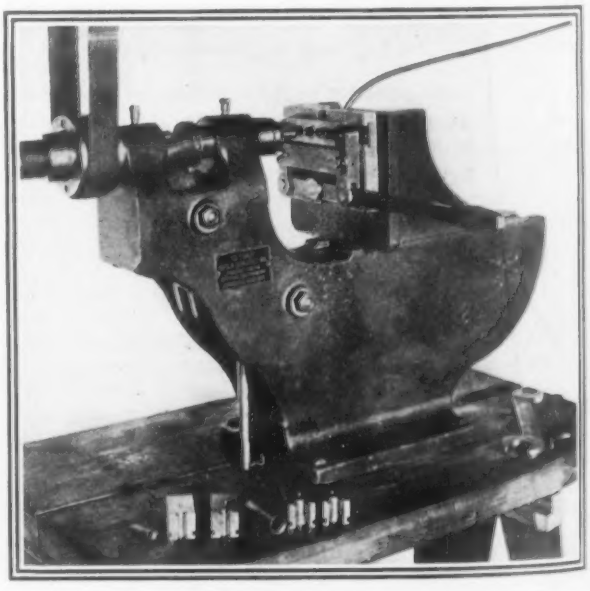
A. J. Davis, vice-president of the St. Louis Chamber of Commerce and president of the Employers' Association of Missouri, was elected president. The other officers are Conrad Mann, Kansas City, vice-president; C. Batreall, St. Joseph, second vice-president; W. J. Dysart, Springfield, third vice-president; John L. Green of the Laclede Christy Clay Products Co., St. Louis, treasurer, and William C. Rogers, St. Louis, secretary.

Headquarters of the organization will be maintained at St. Louis and branches at Kansas City, Joplin and other points. Among the directors of the association are W. A. Layman, president of the Wagner Electric Mfg. Co., St. Louis, and E. J. Miller, president St. Louis Screw Co.

The primary functions of the Associated Industries of Missouri will be to promote constructive relationship between employers and employees and to bring new industries to Missouri.

## Spinning Machine for Tubing

The Grant Mfg. & Machine Co., Bridgeport, Conn., has placed on the market a new spinning machine intended principally for flanging the ends of brass and copper tubing. The tubing is held in position by a hand clamping arrangement attached to the table or knee of the machine. The gripping jaws can be removed and others inserted to accommodate different sizes of tubing.



Spinning Machine for Quickly Flanging the Ends of Brass and Copper Tubing

The machine will flange tubing up to 1 in. in diameter and the time required for each flange is given as one second. The machine is mounted upon a bench in a horizontal position which permits of flanging any desired length of pipe. The operation is controlled by a foot pedal.

Machines are arranged for operation by either belt or motor drive.

# Hot Deformation and the Quality of Steel*

## Three Experiments Determining the Effect on Tensile Strength and Impact Values — Importance of Local Deformations—Gun and Hard Basic Steel Used

BY GEORGES CHARPY

In France many of the official specifications lay it down that in order to obtain certain parts it is necessary to effect, by means of forging, a reduction of the initial section of the ingot, equivalent to a given figure. These conditions are expressed as the "coefficient of working," which is equivalent to the ratio of the initial section to the final section, or, what amounts to the same thing, the ratio of the final length to the original length. The minimum values assigned to this "coefficient of working" are generally 3 or 4, and sometimes higher.

The question is one that appears to deserve examination afresh, and to be made the object of systematic experiments, the more so as the conclusions which may be arrived at may lead to important modifications in the practice of manufacturing large forgings.

### Importance of Local Deformations

It should be noted at the outset that in order to study the influence of hot-working on the properties of steel, it is necessary to take into consideration the local deformation undergone at the very point from which the test piece intended to represent the quality of the metal is to be taken. If the external form of the finished piece be the only guidance afforded in this direction, it should nevertheless be possible to assume that the deformation has been uniform, at least in certain well-determined localities. This remark is sufficient to exclude, from systematic experiments, the use of pieces obtained by forging under the hammer or the press, at any rate under ordinary conditions. The discontinuous action of such appliances will indeed necessarily produce extremely variable local deformations. The successive compressions which allow of there being effected under the forge or the hammer the shaping of a block of metal impart, to a given point in the ingot, a highly complicated path in the course of which it alternately recedes and approaches the axis, the relative displacement of two neighboring points being even much more irregular. It is only necessary to watch an ingot being forged under the hammer or the press, bearing in mind what has just been said, to realize the great importance of the local deformations; it is more difficult to follow them exactly. An approximate value may be assigned to the variations by making datum marks on the ingot.

*Table 1.—Tensile Tests of Differently Rolled Blooms*

| Coefficient of Working | Longitudinal Tests: Tensile Strength | Longitudinal Tests: Elongation | Longitudinal Tests: Reduction in Area | Transverse Tests: Tensile Strength | Transverse Tests: Elongation | Transverse Tests: Reduction in Area |
|---|---|---|---|---|---|---|
| 1.7 | 91.2 | 20 | 111 | 90.9 | 18 | 76 |
| 3.2 | 91.6 | 20 | 140 | 90.5 | 16 | 57 |
| 6.1 | 90.5 | 22 | 170 | 90.6 | 12 | 31 |

The rolling of an ingot into bars introduces no dissymmetry along its axis; test pieces taken from the same bar at equal distances from the axis may be regarded as having undergone exactly the same deformation. It would, perhaps, be straining matters to extend this conclusion to test pieces taken at different points in the same transverse section, but there is, on the other hand, a dominant reason to forego comparison of such test pieces owing to the variations in composition and in structure which are inevitable in the transverse sections of any ingot. This can be seen in comparing two bars of different sections, by collating the results furnished by test pieces taken from regions corresponding with the same fractions of the total radius, and therefore with the same region in the mother ingot.

The author will now describe certain experiments carried out, and, bearing in mind what has already been said, will endeavor to determine the influence of hot-working on the properties of steel.

### First Experiment—Gun Steel

Three identical ingots, of square section with rounded corners (355 x 355 mm.) were cast simultaneously. The metal employed was a gun steel, made in an acid furnace from very pure materials—that is to say, of the quality which will best serve to obtain satisfactory results in tests from bars cut across (perpendicular to the direction of drawing down). These three ingots, regarded as identical, were rolled after having been heated under exactly the same conditions, and reduced to the dimensions of 225 x 225 mm. for the first, 165 x 165 mm. for the second, and 125 x 125 mm. for the third. The coefficients of working were thus 1.7, 3.2, and 6.1. From each of the resulting blooms test pieces were taken for tensile tests, for shock bend tests and for notch tests, with both longitudinal and cross notches. These test bars were all cut from points taken from the same regions of the ingot both in the longitudinal and transverse directions, and were situated at one-third of the distance between the surface and the axis so as to avoid the influence of segregation and of axial porosities; their axes were thus identical from all points of view, except from that of the "coefficient of working."

The test bars were quenched and annealed under exactly similar conditions (quenched from 850 and annealed at 600 deg. C.), and then subjected to tests. The following results were obtained:

*Tensile Tests.*—The tensile strength of each is practically the same; the elongations increase slightly, in the longitudinal samples, under hot working and decrease notably in the transverse test bars, and the same thing, only much more markedly, occurs in regard to the reductions in area. It is, however, the variation in reduction of area which alone influences the total elongation; the curves of tensile strength being practically identical and super-imposable, up to the breaking point. The fractures vary naturally with the reductions in area; they are normal even in the transverse bars in the case of the bloom which has undergone little deformation, and take an oblique form in the transverse bars which have been strongly worked.

*Table 2.—Impact Tests on Notched Bars*

| Coefficient of Working | Longitudinal Tests: 1 | Longitudinal Tests: 2 | Transverse Tests: 1 | Transverse Tests: 2 |
|---|---|---|---|---|
| 1.7 | 6.5 | 7.1 | 5.3 | 5.8 |
| 3.2 | 7.9 | 8.3 | 3.9 | 4.1 |
| 6.1 | 9.9 | 10.1 | 3.5 | 3.5 |

*Impact Bend Tests.*—The tests were made on two bars 24 x 9 x 75 mm., clamped at one end and subjected to the impact of a 10 kg. tup falling from a height of 1 metre. None of the longitudinal bars could be broken by impact. The transverse bars broke respectively after 29, 27, and 23 blows.

*Impact Tests on Notched Bars.*—The bars, measuring 10 x 10 x 53.5 mm. were notched half-way through and tested under the drop test machine. Two bars were tested from each bloom, the notches being given the two rectangular positions possible in the circumstances. The figures given in Table 2 show the work absorbed by rupture, expressed in kilogrammetres and calculated per square centimeter of the section at rupture.

The variations are here much more marked and

*From a paper presented at the 1918 Fall Meeeting of the Iron and Steel Institute, London. The author is the French metallurgist, originator of the Charpy impact testing machine.

most sharply defined. Hot working increases the impact resistance longitudinally and diminishes it greatly in the transverse direction, the more so the greater the amount of deformation. Within the limits of the experiment the average differs but slightly.

### Second Experiment on Same Steel

Instead of taking several different ingots two fragments from the same ingot (the same metal as in the preceding experiment), subjected to different amounts of working, were compared. In the first heat the section was reduced from 355 x 355 mm. to 225 x 225 mm. (coefficient = 1.7), and, secondly, a piece of the bloom thus obtained was submitted to a second heat and the section reduced to 125 x 125 mm. (total coefficient = 6.1). The piece from the first bloom, which had not been re-rolled, was replaced in the reheating furnace at the same time as the second piece, so that it should undergo the same heat treatment. The results agreed completely with those of the preceding experiment.

The two longitudinal bars did not break; neither did the transverse test bar, which had been but little worked. The transverse test bar which had undergone most working broke at the forty-second blow from the tup. Results are given in Table 4.

*Table 4.—Impact Test on Notched Bars in Experiment 2*

| Coefficient of Working | Longitudinal Tests 1 | Longitudinal Tests 2 | Transverse Tests 1 | Transverse Tests 2 |
|---|---|---|---|---|
| 1.7 | 7.5 | 7.5 | 5.3 | 6.0 |
| 6.1 | 9.3 | 9.5 | 3.5 | 3.2 |

### Third Experiment—Hard Basic Steel

The preceding experiments were carried out on metal chosen in such a manner as to eliminate, as far as possible, the differences between the test bars taken, both in regard to the amount of work they had undergone and in regard to its direction. It appeared necessary to try the second experiment over again on a metal

*Table 3.—Tensile Tests in Experiment 2*

| Coefficient of Working | Longitudinal Tests: Tensile Strength | Longitudinal Tests: Elongation | Longitudinal Tests: Reduction in Area | Transverse Tests: Tensile Strength | Transverse Tests: Elongation | Transverse Tests: Reduction in Area |
|---|---|---|---|---|---|---|
| 1.7 | 91.6 | 18 | 110 | 92.2 | 18 | 87 |
| 6.1 | 91.3 | 22 | 165 | 92.5 | 14 | 54 |

of the same grade and of current quality (semi-hard basic steel, as used in the manufacture of shells.)

An ingot 355 x 355 mm. was taken and treated exactly as described above, except that in the heat treatment of the bars annealing was carried out at a higher temperature (650 deg. C.) than in the preceding case, so as to diminish the increase in the tensile strength due to quenching and to get the metal into the condition of minimum brittleness. The results obtained are given in Table 5.

The two longitudinal bars broke after 17 and 40 blows from the tup respectively. The two transverse bars broke after the eighth blow.

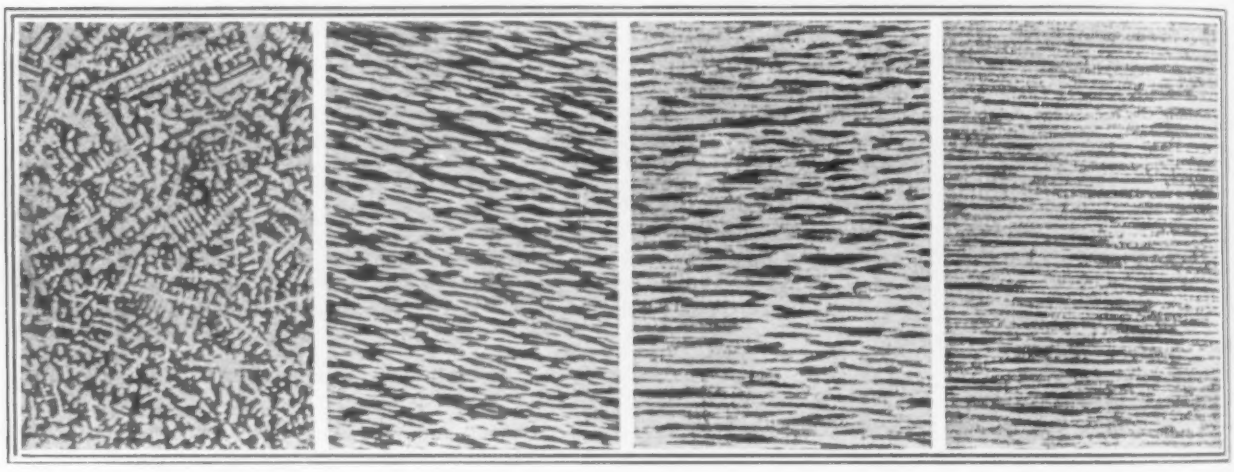
*Notched Bar Tests.*—These are summarized in table 6.

The experiments described confirm and emphasize a series of results of a qualitative nature obtained earlier.

Results obtained with bars from the large ingot 10,000 kg. and 61 sq. decimeters section, are distinctly inferior to those obtained with bars from the small ingot, 800 kg. and 8.6 sq. decimeter section. It would therefore appear to be a certainty that, in regard to pieces tested transversely, a mistake is made every time an attempt is made to improve the quality by increasing the amount by which the metal is drawn down.

Results relative to the influence of hot-working on the properties of steel appear to be pretty easily ascertainable, taking into account the new data as to the heterogeneity of steels which the new cupric reagents recently employed by Drs. Rosenhain and Stead and Mr. Le Chatelier enable us to obtain. Fig. 1 is a reproduction of preparations obtained by this process, and shows that the dendrites formed during the solidification of the steel undergo deformation during rolling, but do not in any way tend to disappear. Subsequent heat treatments do not modify this structure. There is thus found in juxtaposition in the steel two series of elements corresponding with two different compositions [the dendrites of the initial solidification and the filling (*ciment de remplissage*)], and the mechanical properties of which differ.

Fig. 1—Deformation of the Dentrites of the Original Ingot by Successive Rollings



A Ingot, Natural State

B First Rolling, Elongation 5/1

C Second Rolling, Elongation 30/1

D Third Rolling Elongation 150/1

*Table 5.—Tensile Tests in Experiment 3*

| Coefficient of Working | Longitudinal Tests: Tensile Strength | Longitudinal Tests: Elongation | Longitudinal Tests: Reduction in Area | Transverse Tests: Tensile Strength | Transverse Tests: Elongation | Transverse Tests: Reduction in Area |
|---|---|---|---|---|---|---|
| 1.7 | 70.1 | 18 | 33 | 70.7 | 11 | 27 |
| 6.1 | 72.7 | 23 | 60.5 | 68.4 | 4 | 8 |

*Table 6.—Notched Bar Tests in Experiment 3*

| Coefficient of Working | Longitudinal Tests | Transverse Tests |
|---|---|---|
| 1.7 | 3.50 | 2.00 |
| 6.1 | 9.10 | 1.50 |

Rolled steels will therefore always present a structure composed by the juxtaposition of elements practically rectilinear and parallel with the direction of rolling, and the transverse dimensions of which will be the more reduced, according as, other things equal, the coefficient of working has been greater.

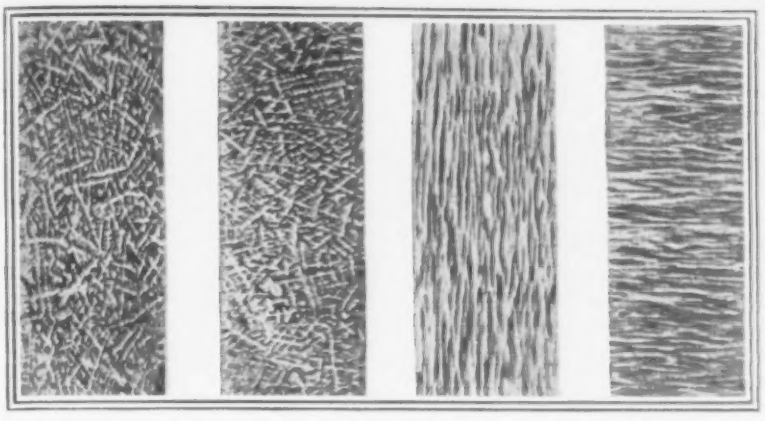
In Fig. 2 is reproduced, enlarged to double natural

size, the structure observed in the impact test bars tested in the second experiment and reported in Table 4.

### Influence of the Orientation

The considerable influence of the orientation of the structures is well brought out in the following experiment:

A piece of the semi-hard ingot employed in the third experiment was reduced, by rolling, to a section of 75 x 75 mm., the coefficient of working being thus equal to 13. The section thus produced did not allow of the different types of test pieces being taken both longitudinally and transversely. Only notched bar test pieces were therefore taken but, in lieu of longitudinal and transverse bars, two others were taken at angles of 70 deg. and 45 deg. with the axis, all taken from the same longitudinal cut. Fig. 3 shows the lay of these bars: There has been reproduced, at a magnification of four times, the structure of the metal, as shown by etching with the cupric reagent, so as to bring out the orientation of the fracture surfaces in relation to the structures of the metal.



A B C D

Fig. 2—These Photomicrographs Show the Appearances Obtained on Etching the Notch Surfaces of One of the Pieces From Four Different Notched Bars, with Cupric Reagent. The test piece A was cut longitudinally and the test piece B transversely from the same billet, which had been drawn down 1.7. The dendrites of the original solidification are but little deformed, and the impact values obtained are in the neighborhood of one another (7.5 for A, and 6.0 for B). The test piece C (longitudinal) and D (transverse) were taken from the same billet which had been drawn down 6.1. The orientations due to rolling are very marked, and the impact values (9.5 for C and 3.5 for D) differ greatly

### Conclusions

From the collection of facts and considerations contained in this paper it may be concluded that the amount of the deformation undergone at a high temperature by a block of steel affects the properties of the metal according to a complex law which involves the initial stage of the ingot and all the subsequent deformations, and the chief characteristic of which is to create strongly marked heterogeneity. There is found a variation in the properties not only of degree, but of nature as well, according as the direction of the test bars employed varies in relation to the piece whence they are derived. The total effect is far from being in the nature of a general improvement, as would appear to be looked for whenever, in specifications, a minimum amount of working is prescribed. It would appear, on the contrary, that the result is more injurious than useful and that consequently, the specification of a maximum deformation would be more logical.

It is impossible to fix a general rule. For pieces working under transverse stresses, such as guns, drawing down lengthwise has undoubtedly an injurious effect, at any rate in mechanical tests required in inspection, and it would be better to reduce it as little as possible.

For steel parts of more complex shape the problem differs in each specific case, and it would appear that the only guidance is by studying the conditions beforehand. The designer, who knows how he wants the part he has designed worked, should construe his ideas into deciding the localities from which test pieces should be taken corresponding with predetermined conditions; these test pieces should be taken in different directions if these be the conditions under which the material will be employed, and the metallurgist, in order to meet with these fixed conditions, should in each case select the type of ingot to be employed and the nature of the deformations to which it is to be subjected.

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The Aluminum Ore Co., East St. Louis, Ill., will soon establish a private steamship service to bring bauxite from the fields of South America to either the East St. Louis or the Baltimore plant of the company. According to C. B. Fox, manager of the East St. Louis plant, the company has not yet decided which of the two plants is to be enlarged. Three steamships of 3500 tons capacity each, are to be delivered to the company for this service in the near future.

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The Mansfield Sheet & Tin Plate Co., Mansfield, Ohio, will enlarge its plant by the erection of a building 230 x 400 ft. and will increase its present capacity about 40 per cent.

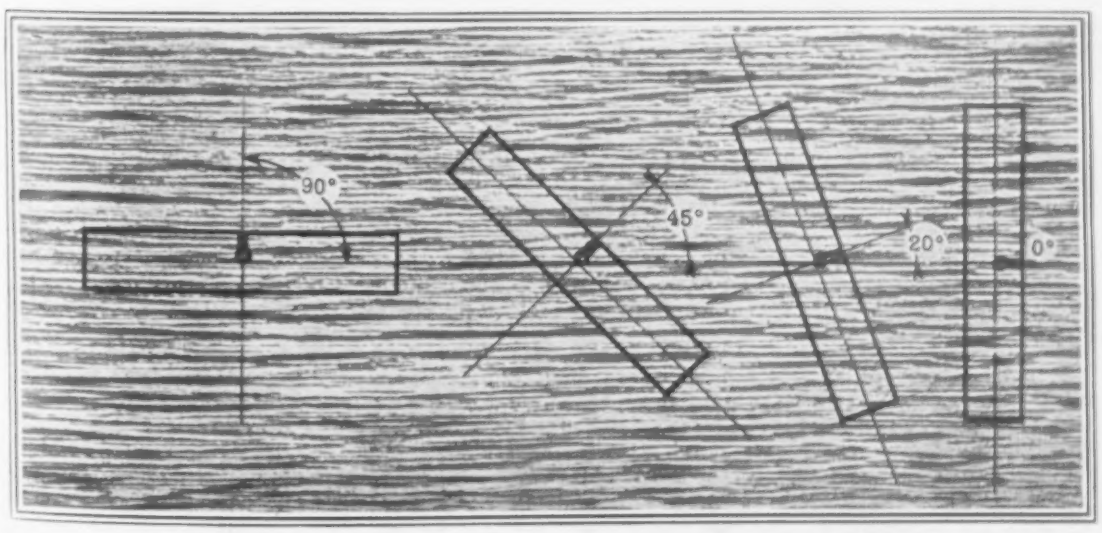
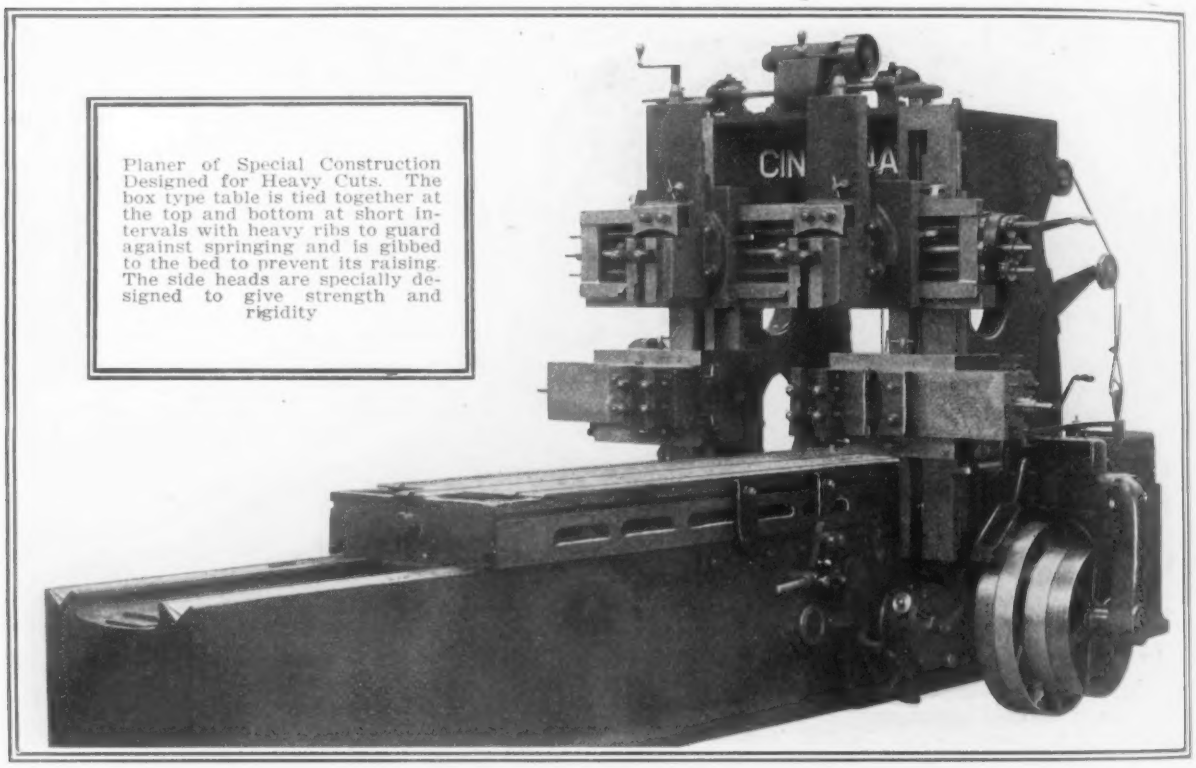



Fig. 3—This Figure Shows the Method by Which Notched-Bar Test Bars were Taken, in a Rolled Bar, to Show the Marked Influence of the Direction on the Impact Value. The test piece, the notch of which is perpendicular with the direction of rolling, gave an impact value of 13.50; the test piece, the notch of which is parallel with the direction of rolling, gave an impact value 10 times lower, or 1.30

## Heavy Duty Planer

A new 30-in. planer designed for heavy duty has recently been built by the Cincinnati Planer Co., Cincinnati. The bed is of a heavy box section, strengthened where the gearing and uprights are mounted. Oil reservoirs are cast in girths at each end of the bed, which catch the used oil, holding it until drawn off through a plug in the end of the bed.

The machine is equipped with a box type table, which is heavy and deep; the bottom side being closed, the chips cannot go through the table but are caught on the inside and thence removed through cored holes at the side. At short intervals heavy ribs tie the top and bottom of the table together thus to prevent springing. The table is also gibbed to the bed to prevent its raising as the tools enter a heavy cut. The housings are of box type and besides being keyed are bolted and pinned to the bed. They are tied together at the top by an arch in order to give rigidity when the rail is at its highest position. The side heads can be run down out of the way of the rail heads.



Planer of Special Construction Designed for Heavy Cuts. The box type table is tied together at the top and bottom at short intervals with heavy ribs to guard against springing and is gibbed to the bed to prevent its raising. The side heads are specially designed to give strength and rigidity

The rail has a deep box brace on the back to give additional stiffness. Two heads are provided, being right and left-hand, which can be run close together. These are furnished with slides which have a full bearing on the harp at all times. The heads are equipped throughout with taper pins to compensate for wear. Special tool blocks are provided of heavy design and are arranged so that at all times the tool will be held in a perpendicular position.

The side heads are specially designed; the saddles are large, and in order to further assure their rigidity they have extra supports on the inside of the housings. These saddle supports are angle plates belted to the inside of the housing and they not only furnish a bearing but carry an inside clamp for the saddle. In designing the side head, the harp has been dispensed with and the slide given a square gibbed bearing directly in the saddle. This construction decreases the number of parts and thereby increases the strength and rigidity of the head. The heads are counterbalanced by a self-contained system of weights and cables, allowing them to be readily raised or lowered by hand. Vertical and horizontal power feeds are supplied to each head from the same friction which operates the rail heads.

The planer is furnished for belt or motor drive.

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"Combustion and Flue Gas Analysis" is the title of paper 219, issued by the Bureau of Mines.

## Phosphorus in Malleable Iron

A paper on "Phosphorus in Malleable Cast Iron" was presented at the 1918 fall meeting of the Iron and Steel Institute in London by J. H. Teng, Bowen research scholar in metallurgy, University of Birmingham. He stated that in a paper read before the Birmingham section of the Society of Chemical Industry, 1917, Professor Turner urged the importance of employing, wherever possible, a poorer class of irons for making malleable castings than those hitherto used, in view of the heavy demand for purer irons for other purposes. The present investigations were undertaken to examine the effect of proportions of phosphorus varying from about 0.05 to 0.5 per cent on the mechanical properties of malleable cast iron.

From the results of the experiments described in the paper the following conclusions were arrived at:

The addition of phosphorus does not result in any improvement in the mechanical properties of the malleable casting.

Any addition of phosphorus leads to a deterioration in the mechanical properties, as shown by tenacity, elongation, and other tests.

The ill effects of phosphorus do not become marked until about 0.20 per cent of phosphorus has been reached, and this may be considered to be the approximate limit for commercial purposes.

That the presence of a considerable amount of silicon and manganese is of more importance than the absence of sulphur with regard to the success of the annealing operation.

That the origin of the sulphide of iron in the spent oxide is attributable to the presence of sulphur compounds in the reducing atmosphere existing in the annealing furnace at about 900 deg. C.

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A branch of the American Steel Treaters' Society was organized at Cincinnati, April 18. The meeting, which was held at the Cincinnati Business Men's Club, was in charge of M. A. Spear, who was selected as chairman. J. M. Manley was elected secretary and treasurer of the chapter. W. H. Eisenman, of the Chicago branch, made an interesting address on "Heat Treatment; Its Past, Present and Future." A. J. Jones, vice-president, the Vanadium Alloys Steel Co., Latrobe, Pa., also made an address.

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The Elliot-Blair Steel Co., Newcastle, Pa., states that its plant at Mercer, Pa., recently destroyed by fire, will be rebuilt.

# American Gear Manufacturers' Association

## Meeting in Cleveland—Progress in Standardization of Design and in Establishing Standard Commercial Practices—Papers on Gear Steels and Tractor Gears

STANDARDIZATION of gears was the predominating topic at the annual meeting of the American Gear Manufacturers' Association held at the Hotel Statler, Cleveland, April 14, 15 and 16. This association, organized two years ago, has enjoyed a steady growth and now is composed of 128 members and 74 member companies, including leading producers of all kinds of cut gears. Ninety-one members were registered at the Cleveland meeting, the attendance being considerably larger than that at the annual meeting at White Sulphur Springs, W. Va., a year ago. Several new additions were made to the roll of members during the meeting.

While the standardization work of the association has not yet reached a point that permitted the adoption of any definite standards at the Cleveland meeting, good progress has been made during the past year both on the plans to standardize gears and to provide uniform practices in marketing the product, and this in spite of the unprecedented demand for gears during the wartime period and of wartime conditions that required so much of the attention of gear manufacturers. The members of the association show a hearty spirit of co-operation and are confident that they will bring about conditions through standardization that will put their industry on a higher plane and prove beneficial both to themselves and to their customers.

The detailed work in connection with the standardization plans is in the hands of a number of standing committees and sub-committees. The general standardization committee held a two days' session at the Hotel Statler in Buffalo in February with a large attendance and during the following month the commercial standardization committee that is working on plans for uniformity in marketing gears held a meeting at the same place. The association also has a very active executive committee, and it was announced at the meeting that this committee will hereafter hold meetings every sixty days.

### President Sinram Re-elected

F. W. Sinram, Van Dorn & Dutton Co., Cleveland, who has been president of the association since its organization, presided at the meetings. At one of the sessions Frank D. Hamlin, Earle Gear & Machine Co., Philadelphia, the secretary-treasurer, took the floor and spoke of the very efficient work in behalf of the association that had been done by President Sinram, and in order to show appreciation of the president's activities moved that the election of a new president be taken away from the executive committee and that Mr. Sinram be re-elected for the coming year. The members approved Mr. Hamlin's suggestion by re-electing Mr. Sinram by acclamation. E. J. Frost, Frost Gear & Forge Co., Jackson, Mich.; William Ganschow, William Ganschow Co., Chicago, and J. B. Foote, Foote Brothers Gear & Machine Co., Chicago, were elected members of the executive committee for a period of three years, the two first named being re-elected to that committee. Later the executive committee announced the re-election of H. E. Eberhardt, Newark Gear Cutting Machine Co., Newark, N. J., as vice-president, and the re-election of Frank D. Hamlin as secretary-treasurer. The executive committee decided that the next association meeting would be held in Boston Oct. 6, 7 and 8.

President Sinram in his annual address entitled "Our Association" at the opening session reviewed the work accomplished by the organization during the past year, taking up the various objects of the association as stated in the constitution, and outlined its aims for the future. "We bring our second association year to a close," he said, "and open our third with our country and business confronted with many large problems. Few question that the future will demand radical changes in many directions. In the evolution which is already under way co-operation will light the way to many of the problems that will arise. The character and extent of this co-operation will measure the influence of the American Gear Manufacturers' Association and have a distinct bearing on the stability of our industry. Our association may be of great value to the individual units represented in it. Industry organization now generally recognized as a part of the plan of modern business proved a vital factor in the successful prosecution of the war, and promises to be of equal value during the so-called reconstruction period."

There are few representative manufacturers of cut gears, he said, who are not affiliated with the association, and this membership shows the desire to co-operate and an appreciation of the value of exchange of ideas. The A. G. M. A., he asserted, is placing the gear business on the plane merited by its character, scope and importance. There have always been optimists in the gear industry. Two years ago it also contained pessimists and semi-pessimists. Through the A. G. M. A. they have been converted into optimists.

Mr. Sinram asked if it could not be justly claimed that the gear business as an industry has advanced and improved to a greater degree during the past two years than during any similar period of its existence. The advancement and improvement of the industry, he said, is two-phased: technical and ethical. Some can assist in the former, all in the latter. The advancement and improvement of the industry demands standardization: technical and commercial. One of the objects of the association is the collection and dissemination of statistics of value to members, and the president said that this was a very important phase of association endeavor. If this were developed to the scope possible the gear manufacturers would ultimately need but one other association affiliation, that relating specifically to labor.

The evolution of gear standards, Mr. Sinram continued, is an obligation the members owe not only to themselves but to the collective gear purchasers and the engineering world. He spoke of the desirability of uniform cost accounting and said that the executive committee should give this matter further consideration. The president, before closing, paid tribute to the efficient services of F. D. Hamlin, secretary and treasurer, and B. F. Waterman, Brown & Sharpe Mfg. Co., Providence, R. I., chairman of the general standardization committee.

### Standardization Committee Activities

Following President Sinram's address the remainder of the day was devoted to meetings of the executive committee and the various standardization committees. The chairmen of the different committees outlined briefly the work of the various committees. These reports included bevel and spiral bevel gearing committee by Andrew C. Gleason, chairman; the spur gear committee by F. E. Eberhardt, chairman; the herringbone gear committee by A. F. Cooke, chairman; the sprocket committee by C. F. Goetke; the composition gearing committee by John Christensen, chairman; the committee on gears and pinions for electric railways and mines by W. H. Phillips, chairman, and the hardening and heat treating committee by R. L. Dodge, chairman.

The Wednesday session was devoted almost wholly to reports of other committees. Chairman Waterman of the general standardization committee in his report indicated that the work of the committees was going along in a satisfactory manner and said that the com-

mittees are on the right track and soon will be able to offer something definite in the form of standards to be submitted to the association for approval. He recommended that the sub-committees adhere rigidly to their programs as outlined, or otherwise nothing would be accomplished. He asked the members to devote their attention first to the simple problems of standardization, and after these are solved they could take up the more difficult problems. He also recommended that if the committees found it difficult to make standardization of all sizes they should limit their attention first to one size and later to turn their attention to larger sizes.

Some interesting standardization details were presented by H. J. Eberhardt, Newark Gear Cutting Machine Co., and considerable discussion of the subject followed. President Sinram remarked that the chief difficulty of doing standardization work is that it is hard to get it under way. He said that there would be many problems this year in the solution of which the association can be of great assistance to the members, but standardization is the big problem. He felt that perhaps the association had tried to accomplish too much at the start, but the main thing was to get under way.

S. L. Nicholson, assistant to the vice-president of the Westinghouse Electric & Mfg. Co., Pittsburgh, was an important contributor to the discussion that came at this time in regard to standardization of product and to a later discussion on the subject of commercial standardization. He said that all standardization work moves very slowly, as was shown by other organizations that had taken up this work, and referred particularly to standardization in motor construction which caused a very heavy outlay by manufacturers. One problem he said the gear makers were confronted with was that of inducing machine tool builders to change the design of their tools to make them fitted to make gears with the changes in design. He spoke of the plan followed by the Electric Power Club, which in some cases makes recommendations of certain standards and the matter is left open and the manufacturers in designing new equipment keep the recommended standards in mind. In some cases standards were adopted fully two years ahead of the time which was set for placing them in effect.

The speaker called attention to the fact that much in the way of standardization was accomplished during the war by the War Industries Board, and pressure was brought upon manufacturers to adopt the board's recommendations, as otherwise they would be unable to get priorities for material. He also referred to the work of the industrial co-operative service section of the Department of Commerce and also said that in standardization work much good can be derived by getting in touch with the Bureau of Standards in Washington and having that bureau adopt the recommended standards, and particularly to have the bureau adopt these standards for Government work.

The discussion regarding some of the details of standardization became at times quite lively and indicated that the members are giving the subject a great deal of interest. Various standardization suggestions that were made during the discussion will be taken up later by the general standardization committee.

President Sinram announced that the executive committee had considered the matter of having an organization publication and this plan would probably be placed in effect shortly. It is the plan to divide the country in districts with a representative in each district to look after the furnishing of information for the publication.

### Commercial Standardization

C. E. Crofoot, Crofoot Gear Works, Boston, Mass., submitted the report of the commercial standardization committee, of which he is chairman. This report included a proposal form for gear makers, including specifications, prices, terms, delivery, contract, conditions, etc. This form was the subject of an extended debate. Some clauses were approved and some were changed materially, and others referred back to the committee for revision.

The greater part of the Tuesday session was devoted to the presentation of papers, the first paper being on "Gear Steels," by J. Heber Parker, Carpenter Steel Co., Reading, Pa., reviewed together with the discussion elsewhere in this issue.

### Worm and Worm Gears

A paper on "Worm and Worm Gears" was presented by G. W. Carlson, Timken-Detroit Axle Co., Detroit. He said that before the development of helical bevels the worm gear began to be recognized as the eventual success of bevel gear in passenger cars, this mainly because of the difficulty encountered in producing gears that would pass the silent test. The lower gear reductions then in use, for the time being at least, eliminated the worm gear as a competitor in this field. The present tendency is toward higher speed engines. The ratios are consequently increasing, and with the present state of bevel gear development the limit in reduction requirements available in them is rapidly being approached.

The worm gear in its present state undoubtedly leaves a great deal to be desired and ample room for further improvemnt. The principal aim in the modern worm gear is to reduce the rubbing action to a minimum and to increase the rolling action to a maximum. The worm gear, like the bevel, so far as concerns correct axle design, has its limitations as regards reduction. Though an excessively high ratio may be employed, the efficiency is reduced proportionately, due to the decreased lead angle, assuming that the center distances are constant.

The material commonly used in axle worm gears is of bronze, generally 89 per cent copper and 11 per cent tin. This combination seems to give the best all around result, in that it presents a contact surface of great durability and a low coefficiency of friction. The castings are chilled around the outer face. The hardness of the chilled portion is usually maintained at about 90 to 100 Brinell. The chilling has a refining effect on the grain of the metal and prevents segregation of the tin from copper and produces a cleaner casting. The worm is usually made of alloy steel carbonized and hardened to a sceleroscope reading of 80 to 90. Though a good polish on the threads is desirable, it seems more essential to have an accurate contour of the wearing surfaces, and it is sometimes the practice to grind the thread twice. The efficiency of the worm gear is theoretically very high when properly designed. Among the great number of variables, and upon which the efficiency depends, the lead angle is the most important.

The presentation of this paper brought out some discussion of the worm drive for tractors, and the suggestion was made that the matter be considered by correspondence within the next few months. In reply to an expression of opinion that the worm wheel drive was not as well adapted for tractors as for truck work, Mr. Carlson said he did not particularly advocate this drive for tractors, but that the worm drive is now being used on the Fordson tractor and has been found successful on some other types of tractors.

### Gears for Tractors

A paper on "Proper Sizes and Material for Gears for Tractor Construction" was presented by E. J. Frost, Frost Gear & Forge Co., Jackson, Mich. He said that it is very much a question whether the tractor to-day has in any large measure reached its ultimate development. From an engineering standpoint the problem of tractor construction has been approached mainly from two different angles, due to previous training of what might be called separate schools of engineers. One of these is represented by men who have had training in making agricultural implements with little or none in the engine, clutch, transmission and differential field. The other type came from the pleasure car and truck manufacturer interests. He predicted that the subject of up-keep, accessibility of parts, etc., will be given increasing attention by future buyers and that it behooves designers to devote their attention to these matters.

He believed that alloy steels can be substituted for

cheaper material, permitting the use of smaller gears and shafts, smaller housings and facilitating protection from dirt and making it easier to apply lubrication. He assumed that these substitutions of alloys can frequently be made with little or no increased expense. He believed that the interests of the manufacturers would be conserved by working towards standardized design and materials.

A brief discussion of Mr. Frost's paper brought from him an expression of opinion regarding the future of the tractor industry. He said that three or four years ago the outlook was not very bright, but that to-day the tractor was coming along faster than anything else in the country. The manufacturers are making an honest effort to produce a good tractor, and it behooves the gear makers to give the tractor manufacturers all the aid they can render in the selection of drive and gears.

The entertainment features of the meeting included a luncheon Monday, when the gear makers were the guests of the Cleveland member companies; an informal banquet Tuesday evening and a dinner Wednesday evening. S. L. Nicholson spoke after the Tuesday evening banquet, giving an interesting talk on the part organized industries took in winning the war and the work of these industries during the reconstruction period. Tuesday afternoon an automobile tour was made around the city. Many of the gear makers were accompanied by their wives, who participated in the entertainment features.

## Joint Convention of American Drop Forge and Drop Forge Supply Associations

The American Drop Forge Association will hold its sixth annual convention jointly with the Drop Forge Supply Association, June 12, 13 and 14, at Pittsburgh. The convention headquarters will be the William Penn Hotel.

The officers of the two associations are as follows: American Drop Forge Association—President, E. J. Frost, Frost Gear & Forge Co., Jackson, Mich.; vice-president, J. F. Connelly, Champion Machine & Forging Co., Cleveland; secretary, A. W. Peterson, American Drop Forger, Pittsburgh; treasurer, E. B. Horne, Packard Motor Car Co., Detroit.

Drop Forge Supply Association—President, H. N. Taylor, N. & G. Taylor Co., Philadelphia; vice-president, Charles Harmon, Jr., National Machinery Co., Tiffin, Ohio; secretary-treasurer, A. L. Wurster, Sizer Forge Co., Bourse Building, Philadelphia.

The local entertainment committee is as follows: For the American Drop Forge Association, A. W. Peterson, American Drop Forger, Pittsburgh, and T. W. Siemon, Union Switch & Signal Co., Swissvale, Pa.; for the Drop Forge Supply Association, Floyd Rose, Heppenstall Forge & Knife Co., Pittsburgh, and Charles E. Hill, Crucible Steel Co. of America, Pittsburgh.

Technical papers on the following subjects will be read and discussed:

Electric Welding as Applied to the Forging Industry
Testing of Materials.
Powdered Coal Developments in the Forging Field.
Sand Blasting versus Pickling.
Heat Treating Problems that Originate in the Forge Shops.
Forge Shop Profits.
The Die Factor in Selling Forgings.
The Low Pressure Exhaust Steam Turbine.
The Bonus System in the Entire Forge Shop.

## Meeting of Chamber of Commerce of the United States

WASHINGTON, April 22.—The Chamber of Commerce of the United States will make another effort to put the business interests of the country on record on readjustment and reconstruction problems at the seventh annual convention to be held in St. Louis, April 28 to May 1. The representatives of more than 125 chambers of commerce and trade organizations as well as the chairmen of the 400 industrial war service committees of the organization are to participate. The subjects to be discussed at the various sessions, it is announced, will include the League of Nations; anti-trust legislation; foreign relations and foreign trade; the disposition and operation of the railroads; construction, disposal and operation of the merchant marine, industrial production and distribution, including the subject of prices.

Among the speakers will be Carter Glass, Secretary of the Treasury; William C. Redfield, Secretary of Commerce; Edward N. Hurley, chairman of the United States Shipping Board; Walker D. Hines, United States Railroad Administrator; Senator Albert B. Cummins and Maurice Casenave, who has just come to the United States as head of the French High Commission.

"At this time," declares the formal announcement of the convention, "when the country is called upon to frame policies that so vitally affect business, it is important that business men make their viewpoints known. And the meeting at St. Louis, coming as it does on the eve of an extraordinary session of Congress, offers an unusual opportunity for business men to advance suggestions with respect to the future relations between Government and business and the future policy of the Government as respects the encouragement of business."

## Bureau of Welding Organized

At a meeting of the American Bureau of Welding, April 11, at the Engineering Societies Building, 33 West Thirty-ninth Street, New York, the by-laws of the bureau were adopted and the following officers elected: Director, C. A. Adams, president American Welding Society; vice-director, H. M. Hobart, General Electric Co., Schenectady, N. Y.; vice-director, A. S. Kinsey, Jersey City, N. J.; treasurer, W. E. Symons, Galena Oil Co., New York, and treasurer American Welding Society; and secretary, H. C. Forbes, consulting engineer and secretary American Welding Society.

Regular meetings of the bureau are to be held on the third Friday of each month.

The bureau voted to establish a research committee for the purpose of carrying out the plan of co-operation in conducting investigations in welding, and appointed to it representatives from the American Welding Society, leading technical colleges, the U. S. Bureau of Standards, and the manufacturers and users of welding equipment.

## Invoice Forms to Be Standardized

The Standardization Committee of the National Association of Purchasing Agents is making an effort to standardize the forms used for billheads or invoices. The subject is to be discussed at meetings of the branch associations throughout the country, and suggestions are sought from anyone who is interested in aiding in this work. This includes various trade and industrial associations as well as individuals.

The association has made progress toward the standardization of catalogs, and it hopes to meet with similar co-operation in eliminating the confusion which now surrounds the matter of invoices. The members of the standardization committee are: W. V. C. Bulkeley, Liberty Steel Products Co., New York; H. H. Meehan, A. B. Dick Co., Chicago; A. Lockwood, Lumen Bearing Co., Buffalo, N. Y.; F. L. Kulow, Willard Storage Battery Co., Cleveland; W. L. Chandler, Dodge Sales & Engineering Co., Mishawaka, Ind. Any suggestions should be forwarded to the chairman of the committee, W. L. Chandler.

The monthly meeting of the Pittsburgh Foundrymen's Association was held in the Chatham Hotel, Pittsburgh, on Monday evening, April 21. H. F. Staley, of the Bureau of Standards, Washington, D. C., gave a talk on "Foundry Clays."

# NEW FRENCH STEEL CAPACITY

## War Efforts of the Industry—Expansion in Cannon and Shell Output

At the recent ceremonies which took place at the Sorbonne, in Paris, to commemorate the efforts of the pupils of l'Ecole Centrale during the war, Leon Guillet presented a number of diagrams showing the development of the manufacture of war munitions and products by the French from 1914 to the time of the armistice. The following translation is made of an article, "Le Developpement des Fabrications de Guerre en France de 1914 à 1918," appearing in *Le Genie Civil*, March 29, 1919:

In regard to iron and steel output, he made the statement that the German invasion deprived French manufacturers of 4,217,670 tons of iron, which was 81 per cent of the total 1913 output and of 3,717,890 tons of steel, which was 73 per cent of the 1913 totals. In spite of unheard-of difficulties, he went on, it has been possible during the war to create installations the annual capacity of which corresponds to the following figures:

| | Tons |
|---|---|
| Blast furnaces | 600,000 |
| Open-hearth furnaces | 241,000 |
| Converters | 241,000 |
| Crucible furnaces | 30,000 |
| Electric furnaces | 55,000 |

M. Guillet paid a tribute to the devotion of the miners who had continued to work near the front under the fire of the enemy, and among installations created and developed during the war, in particular the plant of the Société normande de Metallurgie (ancient Hauts Fourneaux de Caen), which will be able soon to produce 540,000 tons of coke and 300,000 tons of finished products.

The production of brass which had only been 108,150 tons in 1913, will soon reach the total of 539,700 tons, if all the installations which have been projected shall be able to operate to capacity.

An interesting statement is to the effect that the capacity production, or the rehabilitation of 75-mm. cannons had increased from 5 per day in 1914 to about 30 per day at the end of 1916. The daily production of 75-mm. shells, which was scarcely 10,000 per day at the outbreak of the war, had increased by the end of 1915 to 150,000 per day, and in May, 1917, had reached nearly 300,000 per day. The daily output of 220-mm. shells, which in the early months of the war was scarcely anything, commenced to grow rapidly a little after the middle of 1915 and reached 25,000 per day in 1916. In 1917 this output had grown, at least for some days, to almost 35,000 per day. The advance in the output of 155-mm. shells showed similar progress. Finally the necessity of having projectiles of still greater power having been appreciated, there was made toward the beginning of 1916 in still greater quantities 370 and 400-mm. shells, which reached early in 1918 an output of over 14,000 per day of the former and over 10,000 per day of the latter.

## How the French Make Ferrocerium

The manufacture of briquets, or flint (des pierres à briquet), of ferrocerium, was monopolized by Austria before the war, Dr. Auer, who had discovered its pyrophoric properties, having patented the process for making ferrocerium, according to *Le Genie Civil* of Paris.

M. Trillat, in the January-February issue of the *Bulletin de la Société d'Encouragement*, makes public the details regarding the creation of this industry in France by M. Visseaux. A translation is as follows:

Cerium is found in cerite from Sweden or Madagascar, and in monanazite from Brazil which is a phosphate of thorium, cerium, lanthanum and dydimium. By chemical treatment one extracts the thorium from the monanazite as a nitrate suitable for selling. The cerium, lanthanum and dydimium are separated in the form of anhydrous chlorides. The chloride of cerium, which contains a small quantity of lanthanum and dydimium, is decomposed by electrolysis into its elements, chlorine and cerium. The chlorine is liberated at the positive electrode. The cerium is placed in plumbago or iron crucibles, the negative electrode being constituted by the carbon. The alloy, ferrocerium, is finally prepared in refractory crucibles by the fusion at 1100 deg C. of 30 per cent of iron with 70 per cent of the cerium thus obtained without any purification.

When the alloy is entirely fluid it is poured into tubes of thin sheet metal of a diameter of about 2.8 mm. (0.11 in.) and 30 cm. (11.8 in.) long. Sticks of ferrocerium are thus obtained which are cut up into small pieces from 5 to 7 mm. ($\frac{3}{16}$ to $\frac{1}{4}$) long. A kilogram of ferrocerium will make more than 5000 flints each capable of furnishing at least 900 lights or sparks.

Besides ferrocerium M. Visseaux prepares with monanazite a nitrate of thorium for the manufacture of incandescent lamps and cerium itself intended for the production of cerium steels.

## Machine-Tool Exports

WASHINGTON, April 22.—England was the largest customer for our metal-working machinery in February, 1919. Out of total exports of $6,400,717 of these items, according to the Bureau of Foreign and Domestic Commerce, England received $2,638,559, France $1,530,345, and Japan $775,336. Belgium received only $138,413. The figures for the principal countries follow:

| | Lathes | Other Machine Tools | Sharpening and Grinding Machines | All Other Metal Working Machinery |
|---|---|---|---|---|
| Belgium | $71,371 | $609 | $8,309 | $58,122 |
| Denmark | 6,640 | 7,126 | 1,120 | 396 |
| France | 152,036 | 333,776 | 191,441 | 853,092 |
| Norway | 71,762 | 1,106 | 1,648 | 5,840 |
| Spain | 54,765 | 42,645 | 3,990 | 71,975 |
| England | 382,623 | 832,957 | 485,774 | 937,205 |
| Canada | 29,198 | 82,659 | 15,651 | 114,668 |
| Mexico | 8,946 | 4,683 | 4,630 | 10,593 |
| Cuba | 8,044 | 23,814 | 2,385 | 24,850 |
| Argentina | 26,842 | 5,208 | 1,884 | 7,099 |
| Brazil | 29,824 | 10,423 | 2,702 | 15,040 |
| Chile | 8,450 | 6,902 | 6,181 | 13,067 |
| Peru | 6,023 | 12,459 | 1,312 | 3,092 |
| China | 19,870 | 2,210 | 220 | 19,774 |
| British India | 13,645 | 13,864 | 5,196 | 23,389 |
| Japan | 106,964 | 71,559 | 92,231 | 504,582 |
| Australia | 15,012 | 17,759 | 20,847 | 22,605 |
| British South Africa | 28,798 | 5,679 | 4,166 | 9,036 |

## Manganese Ore from India in 1918

Manganese ore exports from India in 1918 were 229,485 gross tons, of which the United States received only a small proportion. The following table gives these exports for 1918 as compared with 1917 in gross tons:

| To | 1918 | 1917 |
|---|---|---|
| United Kingdom | 167,730 | 212,278 |
| France | 34,450 | 26,705 |
| Italy | 1,000 | 7,800 |
| Japan | 12,705 | 5,867 |
| United States | 13,600 | 24,200 |
| Total | 229,485 | 276,850 |

The amounts received by Japan and France are interesting. Great Britain's total imports of manganese ore in 1918 are officially reported to have been 365,606 tons as compared with 331,264 tons in 1917. Less than 50 per cent, therefore, came from India.

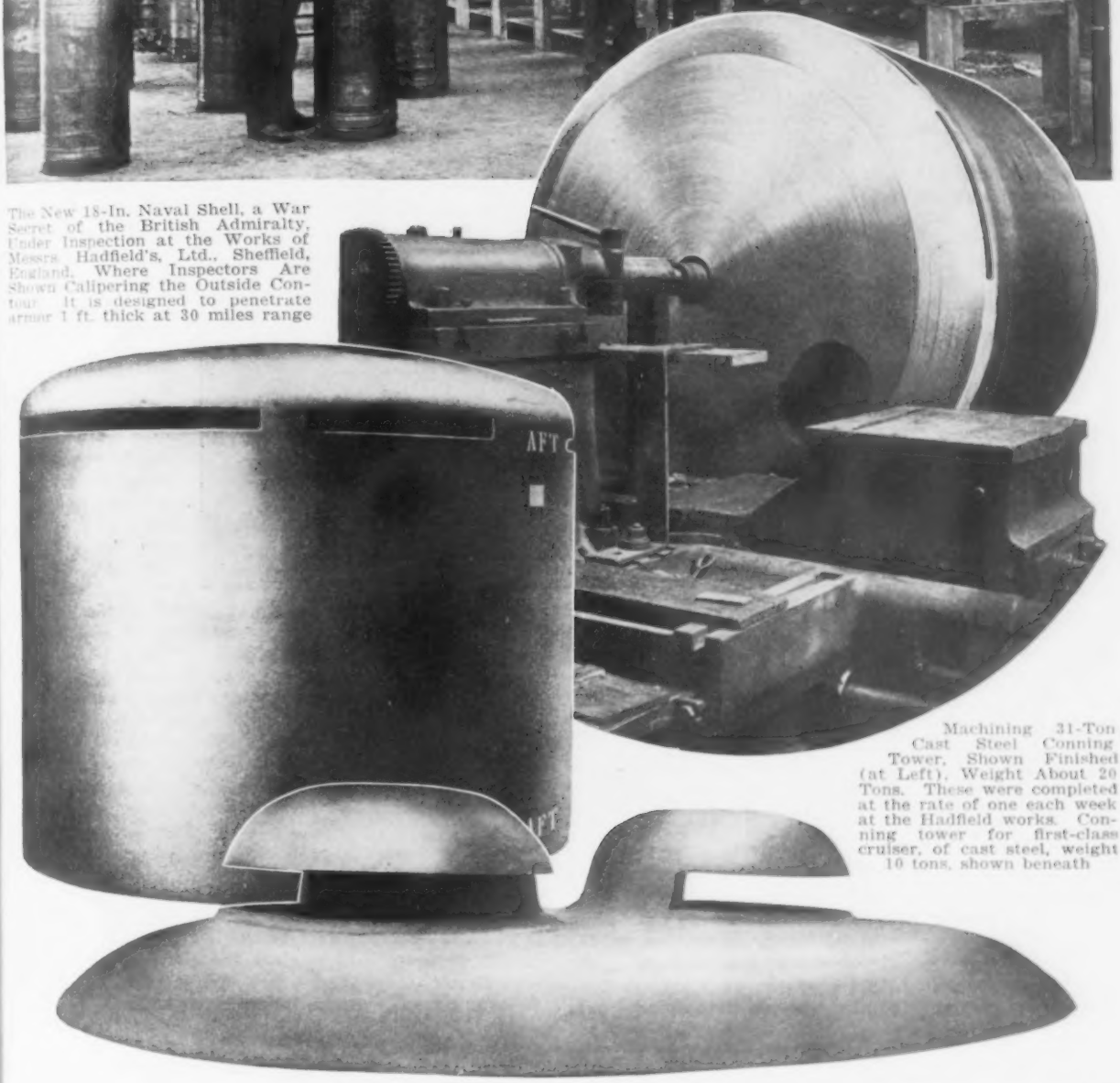
## British Boiler Regulations

WASHINGTON, April 22.—To prepare the boiler construction industry for the changes which are to be made in the British regulations governing steel boilers, the Marine Department of the British Board of Trade has issued new instructions to its surveyors. These cover the impending modifications sufficiently to guide the manufacturers of boilers now ready for construction, where work will be begun before the final regulations will be announced. The circular was sent to the Bureau of Foreign and Domestic Commerce by Consul General Skinner at London.

W. J. Rainey, New York producer of coal and coke has opened a branch office in the Oliver Building, Pittsburgh, with H. B. Prescott in charge.

# ARMAMENT AND AMMUNITION FOR BRITISH NAVAL CRAFT

The New 18-In. Naval Shell, a War Secret of the British Admiralty, Under Inspection at the Works of Messrs. Hadfield's, Ltd., Sheffield, England. Where Inspectors Are Shown Calipering the Outside Contour. It is designed to penetrate armor 1 ft. thick at 30 miles range




Machining 31-Ton Cast Steel Conning Tower, Shown Finished (at Left). Weight About 20 Tons. These were completed at the rate of one each week at the Hadfield works. Conning tower for first-class cruiser, of cast steel, weight 10 tons, shown beneath

IT has often been stated during the war, among other wrong assumptions, that the Germans made the largest gun and the heaviest projectile. The largest gun ever made, it is now stated, is the 18-in. British naval gun, which was used by the British Admiralty during the war on a considerable scale but concerning which information up to this time has not been divulged.

This gun probably weighs about 150 tons, and when elevated to 45 degrees carries a shot weighing no less than 1½ tons for a distance of something like 50,000 yd., or say 30 miles. It may be interesting to state that Sir George Haddock, F. R. S., was largely responsible for its design and construction. Messrs. Hadfields, Ltd., Sheffield, was the maker of the gigantic armor-piercing shell which it fired.

The capabilities of this shell of huge proportions, worked out under the De Marre formula, are strikingly summarized as follows:

When capped and fired and striking normally, it is capable of perforating armor and emerging unbroken on the other side of the plate—at point-blank range no less than 41 in. of hardfaced armor equivalent to a wall of unhardened steel 4 ft. 6 in. in thickness; at 10 miles and 20 miles respectively, 22 in. and 12½ in. hardfaced armor; at the extreme range of 30 miles, ordinary steel armor having a thickness of close upon 1 ft. is pierced.

The illustrations show the large size of this shell, as well as of recent warship armament, indicative of the extreme skill and technique demanded of modern steel works, where very heavy pieces must be manufactured expeditiously and so that they will meet the exacting specifications of both the blueprint and the metallurgist.

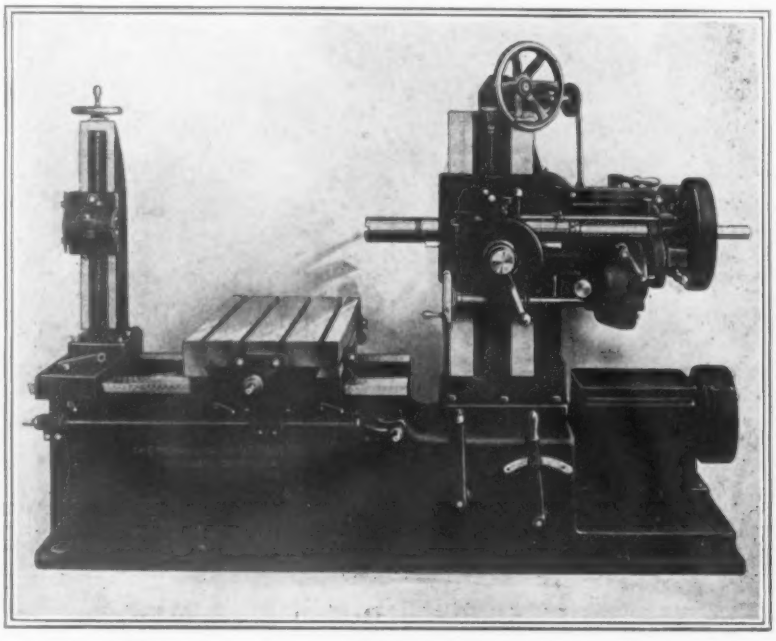
## Horizontal Boring and Drilling Machine

The Morris Machine Tool Co., Cincinnati, has placed on the market a new horizontal boring and drilling machine. One of the features of this machine is that the feed or boring bar is applied to the spindle close to the column thus to lessen chances of springing the bar when under a heavy load.

The column is a heavy box section with a large area at the bottom where it is bolted to the base. The head is counterbalanced and slides on wide ways which have taper jibs adjustable for wear. A steel scale, set in the column and graduated in sixteenths, in connection with the micrometer collar on the head elevating screw enables readings to be had in thousandths for the full travel of the head.

The feed box is a unit mounted on the head. Feed gears are fully enclosed and run in heavy oil. Six feeds are obtained and are marked on a dial in thousandths advance per revolution of the spindle. The feed can be automatically tripped at any depth within the traverse of the spindle.

A distinctive feature concerns the gears, which are of steel, cut on a hobber with ground hobs. The spindle drive gears are helical, the angle of the teeth being just great enough to have more than one tooth meshing and at the same time avoiding end thrust. This arrangement gives a constant power factor at the cutting point of the tool, and it is claimed avoids the slight chatter effect of a spur gear drive.



The Feed Bar of This Boring and Drilling Machine Is Applied Close to the Column

The speed box is mounted on the bed, with gears fully enclosed and running in light grease. Six speeds are secured, controlled by the two vertical levers on the front of the bed below the column. The left-hand lever controls the double friction clutch on the pulley shaft and the other lever shown controls the three sliding gears. The drive can be arranged either through a three to one variable speed motor connected to the lower shaft by one pair of gears or a constant speed motor in connection with the speed box.

The maximum distance between the spindle and table is 20 in., and the maximum distance between the spindle and outer support is 48 in. The table is 20x36 in., with a longitudinal feed of 31 in. and a cross feed of 28¾ in. The height of the table from the floor is 31 in.

Spindle speeds include 18 through speed box and 15 on the pulley. The approximate weight of the machine is 6500 lb.

## The Krupp Plant and Peace Conditions

An inspired article has made its appearance in a number of German papers, describing the present peaceful industrial activities at the Krupp works in Essen, according to the London *Ironmonger*. The Krupp firm, it appears, has always been notorious for its devotion to the arts of peace. We are asked to believe that before 1914 barely one-twentieth part of its production consisted of armaments and munitions, and that railroad axles, hoops, shipbuilding material, rails, implements and machinery, plates and motor parts have always bulked much more largely in its output than warlike engines.

During the war the total number of the firm's employees increased from 65,000 to 170,000, and the number engaged at the principal factory in Essen from 34,000 to 105,000. With the signing of the armistice the entire armament section of the works, with its innumerable costly machines, became suddenly almost worthless, and the subsequent social disturbances have added enormously to the difficulties of the firm. In the great munition shops an "uncanny silence" reigns, and the visitor to them feels as if he were "walking amid the ruins of German industrial life." The only guns that are being made now are for the enemies of Germany, to make up the number deliverable under the terms of the armistice. All the foreign workmen have gone and the total number of men now employed at the Essen works has fallen to 32,000, which is rather less than were engaged just before the war.

Manufacturing for civil industries is, however, gradually being resumed. The armor-plate works are rolling plates for the manufacture of locomotives. Other plants are turning out measuring instruments and cash registers. The steel foundry is chiefly engaged on materials for shipbuilding and parts for Diesel engines, and the manufacture of railroad rolling stock and of axles is in course of extension. There is, however, no immediate prospect of a resumption of the payment of dividends and that for 1918 has already been passed. What is now wanted above everything is a peace which will not lame the industrial existence of Germany. The average daily wage, including boys, rose from 6.38 marks (about $1.50) in July, 1914, to 13 marks (about $3) in October, 1918.

## Krupp Probably Bankrupt

WASHINGTON, April 22.—The Krupp works at Essen, Germany's chief war industry, is probably bankrupt. Only the payment of the heavy claims which the Krupp company has against the German Government—certainly a doubtful asset—can prevent insolvency. A large share of its capital is invested in German war bonds.

Consul General Albert Halstead at Stockholm, Sweden, has reported to the Bureau of Foreign and Domestic Commerce that according to Swedish press reports the future position of the great Krupp works at Essen, Germany, is causing great anxiety to its management. The problem of changing great factories designed for the manufacturing of artillery and other war material to a manufacturing for peace purposes is exceptionally difficult in Germany.

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The Bailey Meter Co. will move its main office and works from Boston to Cleveland, effective May 1. The Boston office, with H. D. Fisher as manager, is retained to handle sales and engineering service work in the New England district. For the present, New York and Philadelphia districts will be covered from Boston and all other districts will be covered from Cleveland.

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Briggs & Turivas, Inc., dealers in scrap, Westminster Building, Chicago, has opened a New York office at 1805 Equitable Trust Building, in charge of Carl R. Briggs, president of the company.

# Judge Gary Reviews Business Conditions

## Believes Price Stabilization Has Failed, but Hopes He May Be Mistaken—Answers Questions as to Dividend and Extension Policies

AT the annual meeting of the United States Steel Corporation in Jersey City, April 21, Judge Elbert H. Gary, chairman of the board, in reply to a question from a stockholder in regard to the price stabilization movement said: "From what I read in the newspapers, I believe the whole plan has been abandoned, but I hope that I may be mistaken."

"I am justified in saying," said Judge Gary, "that if the Industrial Board had believed that it was intended by the Railroad Administration or any one else to act other than impartially and just, or that any manufacturer or consumer was to use the board for seeking unfair advantage, the members of the board would never have accepted appointment." He said that his remarks were not uttered in any spirit of criticism, but he did consider that the difficulties encountered were "most unfortunate," this applying to the Railroad Administration as well as to the industries which might have been stabilized. The Steel Corporation alone paid to the railroads for freight charges last year approximately $189,000,000, and he felt that a quick return to something approximating normal business activity would have benefited the carriers very greatly, while at the same time aiding industry.

### Dividend Policy

In response to a question as to the policy of the company regarding improvements and dividends, Judge Gary said:

"You will recall that about three years ago the finance committee issued a statement in which it was set forth that a rate of 5 per cent should be established and, if practical, maintained, and that if and when conditions justified, other payments should be made as extra dividends." The action on dividends, he said, would be based largely on conditions existing at the time and upon the prospects for the future. "You will observe," he said, "that I have not said what the next dividend will be. That is for the simple reason that I do not know. The directors and the finance committee will be governed in the way I have just indicated.

### Improvements

"We will do everything in the way of making extensions and betterments that will make success for the corporation reasonably sure with competitors either in this country or any other country. We have shown that we intend to keep strong in cash. It requires $150,000,000 to do business comfortably. If the United States Steel Corporation during the last 12 years had been a heavy borrower, conditions in Wall Street during times of stress would have been worse than they were. During the 1907 panic the corporation had $85,000,000 in the banks and left it there, a fact which helped to ease the strain. If we wish to make any additions, we have the cash. The Government never asked to make any extensions that were absolutely necessary for the prosecution of the war that we did not have the money to pay. Neither the banks nor the Government was asked to supply cash." These improvements Judge Gary said were entered into with the highest degree of patriotism, but at that time there was also the knowledge that the war would eventually be over and that received consideration.

### Business Conditions

In regard to business conditions he said:

"I have been accused of being more or less optimistic, but I am never so optimistic as to shut my eyes to possible dangers and to facts. All I can say is that any man who believed that this country has gone into bankruptcy or has embarked upon a period of business depression which will end in disaster, or that in the near future we will enter into such a period of demoralization, is the man who does not possess himself with facts and figures. If you ask how soon the steel industry will return to the period of prosperity on which it had started prior to the action taken by the Director General of Railroads with respect to prices, I cannot give you a definite reply. The date is not so important as the fact. The date depends largely upon the business men throughout the country and not upon any single individual or corporation. I believe the majority of these men know something about the resources of our country and have confidence in them."

### A Misunderstanding

After reviewing the history of the attempted stabilization of the steel industry, Judge Gary said:

"Evidently there existed a misunderstanding all of the time between the iron and steel industry, the Railroad Administration, and the Industrial Board. I am giving due credit to every one for entertaining frank and sincere opinions and having made candid statements. It is plain that if the Railroad Administration had accepted the judgment of the Industrial Board as to what prices were fair, the Railroad Administration would have reaped a large benefit, because business would have been stimulated and a large volume of business would have accrued to the carriers."

### Directors Re-elected

The following were elected to succeed themselves as directors: George F. Baker, James A. Farrell, Elbert H. Gary, J. P. Morgan and George W. Perkins.

# Little Hope at Washington for Price Stabilization

WASHINGTON, April 22.—Even a cablegram from President Wilson directing the Industrial Board and the Railroad Administration to make another effort to carry out the price stabilization scheme has failed to insure its effective operation.

A conference was set for Monday to be attended by Chairman George N. Peek of the board and Judge R. S. Lovett and Henry Walters for the Railroad Administration, but the illness of Judge Lovett prevented his arrival in Washington and the conference was postponed. Thereupon Chairman Peek called a meeting of the Industrial Board. From outward appearances this was a most pessimistic gathering, but none of the members would discuss its proceedings further than to declare that they were doing all in their power to carry out the President's desire. Behind this, however, there was an unmistakable atmosphere of gloom and even the optimism of Secretary Redfield, of the Department of Commerce, who originated the program, seemed to have disappeared.

No one was able to suggest any basis by which a new conference between the contending factions could make progress toward the rehabilitation of the scheme, without a surrender on the part of the Railroad Administration or the Industrial Board. Of this there seemed little likelihood.

As far as the steel industry itself is concerned, no one in Washington seems to have consulted its representatives concerning the attitude of the men for whom the Government officials are trying to frame a price

schedule. Both the Industrial Board and the Railroad Administration seem to take for granted that any schedule they might frame would be acceptable to the steel representatives. They were not over-confident, however, on this score, and there is an undercurrent of feeling that even if the Government officials were to get together they would find it too late to make their agreement effective.

"It is a strange overturning of expectations," said one of the Government conferees. "We had feared in the beginning that the steel industry might decline to co-operate. But it co-operated most heartily. The Government authorities have been the one who have failed to co-operate although we had taken for granted that there could be no hesitation on their part."

The question of wage rates still looms over the conference. The Industrial Board has definitely announced that it would not touch wages. Yet every time there is a suggestion that prices must go lower it is met by the statement that at the present wages, prices cannot be reduced below the basis already fixed. There is, of course, not the slightest likelihood that any Government representative will countenance a suggestion of reduced wages.

### Proposed Decrease in Wages

Chairman Peek of the Industrial Board has been endeavoring to work out a basis for lower food prices in the hope that this might start a decrease in wage rates. But his plan has not been a success and the deadlock over the steel prices has checked entirely all food price negotiations. Politics has also been injected into the question. The fight which is being made against Postmaster General Burleson, particularly by union labor, has helped to make a cleavage in the President's cabinet. Reports in Washington add Secretaries Redfield and Houston to the list of cabinet members whose tenure of office is insecure. No one knows how far the failure of the Redfield stabilization program might influence this.

Director General Hines of the Railroad Administration is on a two weeks' tour to the Pacific coast. In his absence, the Railroad Administration seems to be marking time on the whole controversy. Apparently no purchases of any kind are being made that can wait until a definite policy has been worked out. There are no indications in Washington that Mr. Hines's announcement in Chicago that the Railroad Administration is buying its steel for current requirements referred to purchases of any size. The Navy Department is also holding up the award of 20,000 tons of steel for battleships to await the same price adjustment.

### No Action in Regard to Plates

The largest item of steel business which the Railroad Administration has held up is an order for about 6000 tons of plates, shapes and bars, for canal barges. Bids for this steel were opened April 7 by the Division of Inland Waterways of the Railroad Adminstration, but they have not been made public. The figures were submitted to Director General Hines, but he has taken no action concerning the purchase. As he is now in the West, the Washington offices of the Railroad Administration declare that they do not know whether he is delaying action in the belief that a compromise may yet be reached in the controversy between the Railroad Administration and the Industrial Board.

Although the Railroad Administration is not planning to make any lower rates for the ore traffic from the mines to upper docks, the Shipping Board has cut the rate from $1 to 80c. for the haul from the upper to the lower lake ports. This reduction, doubtless, will result in lower ore prices as the figures agreed upon in the schedule of the Industrial Board provided for a corresponding ore reduction should lower freight rates be put into force.

Officials of the Railroad Administration declare they know nothing of any plan to carry Government freight free on the railroads. At present, a special Government rate is made on the land-grant roads of the West, but this affects the steel business only in the shipment of steel to the Mare Island navy yard. The elimination of the "Pittsburgh base" from War Department prices is due to the decision of Comptroller Warwick of the Treasury that this allowance can only be made on old contracts specifying such a payment, and under official prices fixed by a war board with competent jurisdiction to fix prices binding upon the Government. O. F. S.

## American and British War Exports of Tin Plate

The remarkable expansion in the export trade of the United States in tin plate during the war presents an interesting contrast to the decline in Great Britain's world trade in this commodity in the same period. The tin-plate exports from the United States have increased to over 4½ times what they were in 1913 and 1914 while Great Britain's business has decreased about 50 per cent. The following table contrasts the official data for the last six years:

*Exports of Tin Plate, Terne Plate and Taggers Tin in Gross Tons*

| | From U. S. | From Great Britain | Totals |
|---|---|---|---|
| 1913 | 57,812 | 494,497 | [illegible] |
| 1914 | 59,548 | 435,392 | [illegible] |
| Total | 117,360 | 929,889 | 1,147,249 |
| 1915 | 154,541 | 368,778 | [illegible] |
| 1916 | 227,391 | 321,654 | [illegible] |
| 1917 | 232,798 | 177,383 | [illegible] |
| 1918 | 258,538 | 223,509 | [illegible] |
| 4-Year Total | 873,268 | 1,091,324 | 1,964,592 |

These figures reveal the fact that while England's export movement in tin plate before the war was about eight times that of the United States, by 1918 the United States had surpassed England's outgo. It is nevertheless interesting that Great Britain was able to maintain as large a foreign business as she did in this industry under the conditions.

The output of tin and terne plate in the United States in 1917 was 1,512,145 gross tons; in 1913 the production was 823,718 tons—an increase in four years of nearly 100 per cent. Of the 1917 output, 15.3 per cent was exported whereas in 1913 only 7 per cent of the production went abroad.

The character of the change in the destination of tin-plate exports before and during the war presents an interesting study. These are contrasted for both the United States and Great Britain for the years 1913 and 1918 in the accompanying table, compiled from official data:

*Tin-Plate Exports from the United States and Great Britain in Gross Tons*

| To | From United States 1913 | From United States 1918 | From Great Britain 1913 | From Great Britain 1918 |
|---|---|---|---|---|
| Canada | 39,155 | 64,714 | 9,889 | [illegible] |
| Mexico | 3,442 | 2,021 | | |
| Cuba | 3,022 | 1,954 | | |
| Argentine | 15,541 | 39,126 | | |
| Brazil | 8,582 | 12,539 | 19,323 | 21,307 |
| China | 17,143 | 10,981 | | |
| British Indies | 8,331 | 6,114 | 21,691 | [illegible] |
| Hong Kong | 7,047 | 8,096 | 68,817 | [illegible] |
| Japan | 9,198 | 36,643 | | |
| France | | 13,822 | [illegible] | [illegible] |
| Italy | | 25,498 | [illegible] | [illegible] |
| Portugal | | 3,180 | [illegible] | [illegible] |
| United Kingdom | | * | 14,873 | [illegible] |
| Chile | | 1,148 | | |
| Uruguay | | 18,524 | | |
| Straits Settlements | | 4,787 | | |
| Dutch East Indies | | 4,669 | | |
| Russia in Asia | | † | | |
| Other countries | 43,032 | 4,719 | 102,330 | [illegible] |
| Norway | | | [illegible] | [illegible] |
| Australia | | | [illegible] | [illegible] |
| Russia | | | 9,921 | |
| Germany | | | 34,739 | |
| Holland | | | 43,009 | |
| Belgium | | | 13,363 | |
| Roumania | | | 10,927 | |
| United States | | | 21,516 | |
| Total | 57,812 | 258,538 | 494,497 | [illegible] |

*24,198 tons in 1916.
†3040 tons in 1916.

France, Italy and South American countries took large quantities of tin plate in 1918 from the United States as well as large quantities from England despite the fact that England's output and exports were less than normal. Japan absorbed in 1918 more than four times as much as in 1913, all from the United States.

# Constructive Labor Program Demanded

## Former Governor Bass Declares That Neither Force Nor Appeal to Patriotism Will Stop Bolshevism in the United States

WASHINGTON, April 22.—Neither force nor appeals to patriotism can stop Bolshevism, according to the final report of Former Governor Robert P. Bass of New Hampshire, as Director of the Marine and Dock Industrial Relation Division of the United States Shipping Board.

According to Mr. Bass, the only hope of America's resisting the tide of industrial unrest which he says is sweeping over the world is in the development and early application of a constructive industrial program. This program to combat this propaganda follows:

"The Government should systematically inform both employers and employees in regard to many matters of the utmost interest and importance to each.

"It should acquaint labor with the Government's activities and service to labor in the past.

"It should create in labor an appreciation of its joint interest with capital and with the Government in the problems of production.

"Satisfactory assurances should be given that labor will have a substantial voice in determining the distribution between capital and labor of the profits of production.

"Labor should be promised its reasonable share of any increase in production.

"There should be a joint determination of wages, hours and conditions of work.

"Based on the foregoing principles, great emphasis should be placed on labor's interest and responsibility in the processes of production.

"Finally, there should be a detailed analysis and full explanation of all the processes and problems of production, accompanied by explanations to each group of workmen as to the particular way in which they can facilitate and improve those processes.

"I believe that we have emphatically come to the time when we must make it clear to the workman himself that production is his problem and that he will profit or suffer in direct degree as this problem is effectively or ineffectively handled. In order to make this possible, labor must be given its full responsibility, together with the power to act in relation to that responsibility. We must promulgate a labor policy which affirms labor's right to a substantial voice in determining the conditions under which it works and labor's corresponding responsibility. A means must be found to measure the results of labor's actions and to make these clearly understood by the men who actually do the work. If possible, we must convince employees that there is a way in which they can give expression to all their legitimate aspirations; that there are impartial and effective means for the constructive development of those principles which are to-day demanding expression throughout the industrial world.

"Such educational work is sorely needed at this time for the purpose of establishing a sound basis of industrial relations between the Government, the productive workers and the management in industry. It may perhaps serve as a safeguard against extreme revolutionary industrial propaganda, which now threatens the industrial organization of the whole civilized world.

"The time has passed when the appeal to patriotism will have any influence. Revolutionary industrial propaganda can never be stilled by arbitrary suppression, by court decisions, by imprisonment, or by strong-arm methods. In my opinion, the use of these methods constitutes grave national danger. It will jeopardize our whole industrial organization and present system of civilized development and will destroy our present form of government. The kind of disorganizing propaganda now so far-reaching in its scope cannot be forcibly suppressed. It can only be successfully combated by enlightened, sound and universal education among those whom this propaganda is intended to reach."

O. F. S.

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### In the Labor World

For the first time since before the war, labor difficulties are arising at Detroit. A strike of meat packers last week was followed by a strike of the employees of the Wadsworth Mfg. Co., demanding recognition of their union, which is Local No. 127 of the United Automobile, Aircraft and Vehicle Workers of America. To assist in settling the difficulty, the Wadsworth Mfg. Co. adopted a new wage scale, with $6 a day the minimum, making a total annual increase of $250,000, affecting 2000 workers including 300 women. The new wage scale is patterned fater the Ford minimum wage, profit-sharing plan. The company will retain its 8½-hr. day with no work Saturday afternoon. The employees have not yet returned to work, demanding recognition.

The Milwaukee Employment Men's Association was organized at Milwaukee, Wis., on April 17, with a charter membership of 15 employment managers in local industrial plants. Officers were elected as follows: President, Percy E. Pope, Pfister & Vogel Leather Co.; vice-president, J. W. Schmidt, Northwestern Malleable Iron Co.; secretary, D. C. Hinstorff, International Harvester Co.; treasurer, C. G. Tufts, Cutler-Hammer Mfg. Co.

The second annual Wisconsin Industrial Service Conference will be held at Milwaukee, April 28, 29 and 30, under auspices of the Industrial Commission of Wisconsin. The speakers will include: R. M. Little, New York, director of the Safety Institute of America; John Calder, engineer, New York; C. W. Price, general manager, and S. J. Williams, secretary, National Safety Council, Chicago; Miss Mary Van Kleeck, director Women's Industrial Service, Washington, D. C.

Because officials of the Landis Machine Co., Waynesboro, Pa., refused to reinstate an employee who fellow employees assert was laid off without justification, 150 fellow employees in the machine department went out on a sympathy strike last Saturday.

Commissioner P. F. Gill has been assigned by the Department of Labor to attempt conciliation of what is considered a serious labor situation in the lead mining industry of southeast Missouri. The miners charge that the St. Joseph Lead Co. has repudiated the award of the War Labor Board in regard to wages and working conditions and has evicted some workmen from their homes to permit imported labor to take their places. About 500 men are said to be involved in the controversy.

The House of Representatives of the Missouri State Legislature has passed a bill creating a Soldiers and Sailors Re-employment Commission and appropriating $10,000 for the use of the commission in finding employment for dischaged soldiers, sailors and marines.

Graton & Knight Mfg. Co., Worcester, Mass., will again, as for the past two years, furnish garden privileges this summer for employees. About the middle of May the land will be plowed and made ready for planting. This work is done gratis by the company, which also supplies seeds and fertilizer delivered at cost.

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The Nilson Die & Tool Co., Chicago, has purchased the Strand Machinery Co., manufacturer of the Strand pneumatic die cushion.

# STEEL FOR GEARS

## Case Hardened and Tempered Gears Chiefly for Automotive Work

The composition and physical characteristics of steels for gear making as well as suggestions in heat treating in this connection were given in a paper on "Gear Steels" read before the American Gear Manufacturers' Association at Cleveland last week by J. Heber Parker, Carpenter Steel Co. From the paper the following passages have been taken and appended in a report of the ensuing discussion:

Tempered gears have sometimes been criticised on account of pitted tooth surfaces, which were found after limited service. It is believed that this pitted condition is caused by excessive unit tooth pressure due to several causes. A few experiences where the condition of pitted surfaces was corrected may be of interest.

1. Misalignment of gears was believed to be the cause of the trouble, thus throwing an excessive load upon only a part of the tooth and vastly increasing the unit tooth pressure. When the gears were properly adjusted and the load properly distributed, pitting disappeared.

2. A little lower drawing temperature after hardening which resulted in an increase of about five points in Scleroscope hardness eliminated pitting. The slight increase in hardness was sufficient to enable the gear tooth to withstand the unit tooth pressure put upon it.

3. Pitting was eliminated by increasing the length of the tooth face. This increase resulted in decreasing the unit tooth pressure to a safe figure. Properly case-hardened gears, which have a Scleroscope hardness of about 90, will undoubtedly withstand, without pitting, unit tooth pressures which will give trouble in the case of a tempered steel gear which is about 75 Scleroscope hard.

For automotive work case-hardened steels of six types are generally used, three of the types quite commonly, while the other three have a more restricted use on account of their higher cost with, perhaps, a little more careful heat handling requirements. An accompanying table gives analysis of each, together with the physical properties of the core, when properly heat treated, which may be expected when these steels are made by mills having more of the quality than a tonnage perspective.

The physical properties given in the table were secured by treating a standard test piece, 0.025 in. full to size, by heating in sand for the length of time and at the same temperature as would be used in carburizing for the various types of steel. Test pieces were then allowed to cool in a box and given a full double treatment which would have been given a piece of the respective steels to put them in their best possible case-hardened condition. Test pieces were then ground to size and pulled.

*Characteristics of Six Classes of Case-hardening Steel for Automotive Gear Work*

| Name | Per Cent C. | Per Cent Mn. | Per Cent Si. | Per Cent P. | Per Cent S. | Per Cent Cr. | Per Cent Ni. | Elastic Limit, Lb. per Sq. In. | Tensile Strength, Lb. per Sq. In. | Elongation, Per Cent | Reduction Area, Per Cent | Brinel Hardness | Sclero. | Guillery Impact, Kg.-m. | Sclero. of Case |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Simple carbon ..... | 0.20 | 0.50 | 0.20 | 0.04 | 0.04 | ... | .. | 50,000 | 75,000 | 20 | 55 | 190 | 30 | 18 | 90 |
| Mild chrome nickel..... | 0.20 | 0.60 | 0.20 | 0.04 | 0.04 | 0.04 | 1.25 | 100,000 | 150,000 | 12 | 40 | 287 | 40 | 10 | 90 |
| 3½ per cent nickel..... | 0.20 | 0.60 | 0.20 | 0.04 | 0.04 | ... | 3.50 | 105,000 | 160,000 | 13 | 45 | 302 | 50 | 11 | 90 |
| 5 per cent nickel..... | 0.15 | 0.40 | 0.20 | 0 04 | 0.04 | ... | 4.75 | 125,000 | 175,000 | 15 | 50 | 321 | 54 | 10 | 90 |
| Medium chrome nickel.... | 0.17 | 0.40 | 0.20 | 0.03 | 0.03 | 1.00 | 1.75 | 140,000 | 180,000 | 13 | 50 | 340 | 58 | 11 | 90 |
| High chrome nickel..... | 0.12 | 0.40 | 0.20 | 0.03 | 0.03 | 1.25 | 4.00 | 150,000 | 200,000 | 13 | 52 | 375 | 60 | 10 | 90 |

### Carburizing

Carburized pieces should not be quenched directly from the carburizing box, and this practice should not be followed except in cases where a hard surface only is desired and nothing in the way of strength and toughness of core is expected. If carburizing temperatures are relatively low, that is: about 1550 to 1560 deg. Fahr., good results may be obtained by a single quench after pieces have cooled in the carburizing box and have again been reheated to the proper temperature. For best results, however, a double quench after carburizing is desirable; the first quench from a temperature sufficiently high to refine the core, which is low in carbon, and the second quench at a proper temperature to refine the case, which is very high in carbon. Drawing after final hardening is desirable to relieve hardening strains and to secure increased toughness.

Warping of case-hardened gears, as a result of heat treatment, always occurs to a greater or less extent. The warpage will be somewhat reduced if care is taken to anneal forgings before machining. Forgings as they come from the hammer and cooled under varying conditions always have some internal strains. The release of these strains by annealing leaves the metal in a state of rest which makes possible a decrease in warpage in the finished pieces, for without the annealing the strains in the metal due to forging often are relieved during the case-hardening operations, with the result that they are the direct cause of some of the warpage experienced.

Tempered gears are made principally from four types of steel, two of which are in common use while two types are more rarely used, especially one of the latter, an air hardening chrome nickel steel, which has been used very little in this country. An accompanying table gives the type analyses and physical properties of these steels in gear conditions. In addition to these standard types there has been sold a silico-manganese steel of approximately 0.50 per cent carbon, 0.75 per cent manganese and 1.50 per cent silicon, which has, when hardened and drawn for gear condition, an elastic limit if approximately 225,000 lb. per sq. in. This steel when properly hardened remains practically constant as to size, and has proved most satisfactory as a steel for clash or change gears.

### Gears for Commercial or Jobbing Work

The ferrous materials for gears for jobbing work may, perhaps, be put into five groups:

1. Cast iron and semi steel.
2. Steel castings.
3. Unhardened and untreated steel.
4. Case-hardened steel.
5. Tempered steel.

Unhardened and untempered steel is usually picked up out of warehouse stocks by the gear maker and is usually considered by him as good or bad, depending entirely upon his ability to machine it easily. It may represent almost anything from 0.15 to 0.40 per cent in carbon with usually very high values for manganese, phosphorus and sulphur, the latter two elements being the ones whose presence is necessary in relatively large amounts in order to insure easy machining. The tensile strength of steel of this character will vary between 55,000 and 70,000 lb. per sq. in, with the elastic limit approximately half of this amount and the elongation of 20 to 30 per cent in 2 in. For gears of ordinary service it is undoubtedly superior to cast iron, semi-steel or steel castings untreated, but, of course, cannot compare in service with either the case-hardened or treated gears.

Case-hardened steel is purchased in bar form, in forgings and in rolled blanks. The standard analysis is: Carbon, 0.15 to 0.25 per cent; manganese, 0.40 to 0.60 per cent; phosphorus, not over 0.04 per cent; sulphur, not over 0.05 per cent.

Carbon over 0.25 per cent should not be used except in very special cases on account of the hard, brittle core which will result, and where tooth sections are relatively

small it would be well to hold the carbon to 0.20 per cent as a maximum.

Again, bar stock, forgings and rolled blanks represent the conditions in which tempered steel reaches the gear maker. A handbook, by a steel manufacturer of forged and rolled carbon steel spur gear blanks, gives two ranges of carbon contents for this type of work: the medium grade of 0.35 to 0.50 per cent and the hard grade of 0.55 to 0.65 per cent carbon. The speaker is of the opinion that the latter grade is too high in carbon for quenched gears, and that 0.35 to 0.50 per cent carbon is the range which will, on the whole, give most satisfactory results from the standpoint of ultimate service, warpage in hardening and breaking either in hardening or in service. The physical properties to be expected from this type of gear will vary considerably, depending upon the carbon content, the size of the tooth section and the quenching medium, oil, water or other aqueous solution.

In a general way, a 0.40 per cent carbon straight carbon steel 1 in. round as rolled will show approximately: 50,000 lb. per sq. in. elastic limit; 90,000 lb. per sq. in. tensile strength; 20 per cent elongation in 2 in.; 40 per cent reduction of area.

The use of case-hardened and tempered alloy steels, in place of simple carbon steels, for jobbing or commercial gears, undoubtedly will largely increase. The speaker believes this development can be made especially promising in the field of gears made of alloy steel castings, where the use of the electric furnace makes possible a better grade of alloy steel castings than could be formerly obtained.

Just one instance of one type of service will show the possibilities. Sixteen-inch merchant mill pinions made of 0.40 per cent carbon simple carbon steel castings untreated lasted in service on the average from 9 to 12 months. Chrome nickel steel castings of 0.50 per cent carbon heat treated lasted on the same job 7 years and are still going. The possibility for a gear maker in developing a field of this kind seems almost without limit, especially if this development is worked out in close co-operation with a steel foundry making electric steel castings.

### Sulphur and Phosphorus Limits

Some interesting points were brought out by Mr. Parker in response to questions after the presentation of his paper. He was asked whether he had made any experiments to determine what percentage of phosphorus and sulphur was necessary to produce harmful effect on the properties of steel, and replied that the impression that phosphorus and sulphur were very detrimental constituents had been handed down from the dark ages. During the war the standardization committees of the Society of Automotive Engineers and the American Society for Testing Materials had let down the bars on phosphorus and sulphur to a large extent, because it was impossible to obtain steel in the large quantities required under the rigid specifications as to these two elements which had previously been insisted upon. Dr. Unger, of the Carnegie Steel Co., had made some tests with high sulphur steel in which the excess sulphur was added to the steel in the mold, and his results showed that an excessive sulphur content had no deleterious effect. But this method of adding sulphur had been objected to by some of his colleagues. Mr. Parker said that the greatest value of low sulphur in steel was the fact that it was a criterion of the condition under which the steel was produced, because sulphur could be eliminated only by means of a reducing slag, and the fact that there was a low sulphur content therefore showed that the steel had been made in a reducing atmosphere.

### Standardized Shock Testing Machine

In reply to a question as to whether there was not a tendency toward non-uniformity in the quality of 3½ per cent nickel steel, Mr. Parker said that this steel had a tendency to laminate, and as a result showed low values in transverse tests. The addition of a small amount of chromium overcame this tendency. During the war there was a controversy in the Ordnance Department over this matter, one side wanting to use steel containing 3 per cent nickel and 0.50 chromium instead of 3½ per cent nickel to give the steel a greater transverse strength. The matter of shock tests and drop tests was referred to in the discussion, and it is stated that it is almost impossible to make a comparison of the results of such tests owing to the use of different machines and to the different conditions in making the tests. It was suggested that the gear manufacturers might take it upon themselves to standardize a shock testing machine for gear material.

Mr. Parker, in reply to a question as to the value of vanadium steel, said that he did not favor the use of small quantities of vanadium in steel. The statement had been made that vanadium steels had better machining qualities than chrome nickel and other high-grade steels, but they ran up against the difficulty that there was no recognized test for machinability. Steels containing a small vanadium content were of high quality, but with vanadium climbing back to its old price of $10 per lb., the outlook for popularizing these steels was rather discouraging.

### Air Hardening Steels

A question was asked relating to the air hardening chrome nickel steels, and Mr. Parker said that these were introduced into this country from Belgium and only a small amount had reached this country previous to the war. This steel contained 0.30 per cent carbon and 1.5 per cent chromium, and 4½ per cent nickel, and its most valuable characteristic is that it hardens in the air without practically any distortion. Mr. Parker said that the annealing of air hardening chrome nickel steel must be looked after very carefully, as it must be annealed within very narrow temperature limits. Its use is restricted because of the difficulty in annealing and because of its hardness, which makes it difficult to machine. An important feature of this steel is its absence of warpage, and it has proved very successful in special fields. It has been used to some extent recently in airplane parts.

In carbonizing large gears Mr. Parker said that if a core is placed in the center of the carbonizing box gears could be carbonized in one-half the time. He also recommended that in carbonizing small parts where a number of parts are placed in the carbonizing box a core be placed in the center of this box, maintaining that by following this plan the parts would be case-hardened much more accurately, and the danger that when the parts around the outside had a right depth of case those at the center of the box would be insufficiently case-hardened, would be eliminated.

*Characteristics of Four Classes of Tempering Steels for Automotive Gear Work*

| Name | Per Cent C. | Per Cent Mn. | Per Cent Si. | Per Cent P. | Per Cent S. | Per Cent Cr. | Per Cent Ni. | Elastic Limit, Lb. per Sq. In. | Tensile Strength, Lb. per Sq. In. | Elongation, Per Cent | Reduction Area, Per Cent | Brinell | Sclero. | Guillery Impact, Kg.-m. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Medium chrome nickel type A | 0.50 | 0.40 | 0.20 | 0.03 | 0.03 | 1.00 | 1.75 | 260,000 | 300,000 | 6 | 16 | 495 | 76 | 5 |
| Mild chrome nickel type B... | 0.50 | 0.40 | 0.20 | 0.03 | 0.03 | 0.70 | 3.00 | 235,000 | 260,000 | 7 | 18 | 444 | 74 | 5 |
| High chrome nickel..... | 0.40 | 0.40 | 0.20 | 0.03 | 0.03 | 1.25 | 3.50 | 250,000 | 285,000 | 6 | 18 | 490 | 76 | 5 |
| Air hardening chrome nickel.. | 0.30 | 0.40 | 0.20 | 0.03 | 0.03 | 1.50 | 4.50 | 220,000 | 255,000 | 9 | 22 | 460 | 70 | 7 |

Of the total manganese ore imports in the United States in January of 47,504 gross tons, 32,352 tons came from Brazil and 14,051 tons from Cuba, the latter a surprising total. The rest of the imports were made up of 441 tons from Chile, 609 tons from Mexico and 51 tons from Japan.

ESTABLISHED 1855

# THE IRON AGE

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## Extent of Readjustment

As it is held by the majority of psychologists that thinking is an exclusively human function, it would be inappropriate to refer to loose thinking as a particularly human thing; yet loose thinking does seem to be a common thing these days, and particularly so with reference to this matter of reconstruction or readjustment. As to prices, much of the argument one hears and reads appears to be on the question whether prices will remain at the war-time level—or even advance—or will return to the much cited "pre-war average." After all, however, it does seem reasonable to conclude that neither will be the case, that some intermediate ground will be found. Then as to readjustment in general, it seems to be commonly assumed that readjustment—dropping the matter of prices, which really is more or less merely a detail—means returning to pre-war conditions, with certain minor modifications forced by the war.

The terms reconstruction and readjustment are unfortunate in that they suggest return or re-establishment of old conditions. The idea seems to have been adopted largely because it is convenient, and saves mental effort, to take something that is easily pictured and assume that we are making to it. But men do not want to return to the old conditions. The workman has made it plain that he does not. He has indicated in a number of ways since the armistice that he has not reached the limit of his desire for high wages and short hours. Capitalists, captains of industry, men of affairs, however, have much the same mental attitude. They are not as eager to make money, to bring about new developments, as before. This fact has not been made clear, because these men lack spokesmen, such as Mr. Gompers. The effects, however, come from the working of men's minds, not from the publicity that chances to be given to the mental operations.

One may picture the people in European countries as being eager to work for work's sake as well as for other reasons, and admit, possibly, that perhaps the same mental attitude does not exist in the United States; but it is yet to be learned that in the European countries there is that intense spirit of working hard that was predicted would be a feature of after-war times. The very spread of Bolshevism is rather suggestive, while practically all recent reports indicate that in Great Britain and France there is not the keenness for work that was expected.

All this means that the so-called "readjustment" is going to lead along somewhat different lines, and to a different end, from what seems generally to be assumed. More than five months have elapsed since the signing of the armistice and one does not need to depend entirely upon theory in order to form an opinon on the trend. Some opportunity has been afforded to observe what men seek. First, it is an outstanding fact that of all markets the automobile market has been the most active. Men appear to want automobiles more than anything else. Day by day reports become more indicative that a great period is opening in the building of dwelling houses. There is a great "shortage" of houses—though during the war there was room for every one under a roof—and it seems absolutely certain that there will be much activity in the erection of dwellings. Men have shown that the two things they want most are automobiles and comfortable homes.

One finds, therefore, some ground for the suspicion that the American people have rather made up their minds to take things easy in future. As counter to such a theory might be cited the universally expressed desire that the country should "build up" a great export trade, the expression being quoted because it is not always clearly applicable, the disposition being more to "get" trade than to build up from a substantial foundation.

What other important line of activity is seen to be in contemplation? There are various other business activities that might be undertaken, if people desire to work hard and intelligently, besides selling goods to other countries. From a neutral standpoint this matter of exporting might indeed seem one of the least promising lines of human endeavor. The United States is rich, while the rest of the world collectively is comparatively poor. In four years, 1915 to 1918 inclusive, there was a merchandise trade balance in our favor of $11,266,000,000. In the first three months of this year the favorable balance has aggregated $1,100,000,000, equal to a rate of $4,400,000,000 a

year. The world cannot increase its debt to us at any such rate, but rather should be exporting goods to us in order to pay interest, if not the principal, on the large debt already accumulated. To talk about "building up" an export trade when the balance is already running against the outside world to the tune of $4,400,000,000 a year looks rather like another effort to take things easy.

That the people of the United States, whether wage earners, capitalists or entrepreneurs, have good and sufficient title to take things easy may be questioned; but that the intention does exist is an idea that cannot lightly be dismissed. If the intention exists, and if the effort is going to be made, "readjustment" will prove to be a very different thing from the usually expected return to pre-war conditions, aspirations and activities.

## Settle the Railroad Question

Through the failure of the Industrial Board and the Railroad Administration to reach common ground in the matter of steel prices the test of what purchases the Railroad Administration has occasion to make has failed, but all the signs are that no matter how satisfactory the prices the purchases would have been relatively small.

With the ultimate disposition of the railroads in doubt no really constructive program can be formulated. All that can be considered is a matter of upkeep, to make as small as possible the settlement between the Government and the railroads in accordance with the proviso that the roads shall be returned to their owners in the same physical condition that obtained when the roads were taken over. As this condition cannot be met precisely there will be, presumably, some sort of a cash settlement for one party or the other, to make up such difference as exists.

While technically or legally the ultimate disposition of the railroads is in doubt, practically there is scarcely any doubt. The railroads are going to be returned to their owners. All that remains for Congress to do is to enact the legislation necessarily involved. There is hardly any sentiment, in any quarter, in favor of any other policy than the return of the roads to their owners. But equally it is clear that various items of additional legislation are required to modify the status of the railroads when that event occurs, relative to the condition that obtained before the roads were taken over.

The circumstance under which the railroads will operate in future will determine the extent to which they will desire, and will be able, to improve their facilities. There are various choices to be made. The country can get along, in a fashion, with a relatively small amount of transportation, making all its industrial work more sectional in character, or it can have excellent transportation facilities by paying the necessary price. It is a matter of choice just how much transportation is to be furnished in future. There is likewise a choice as to the use of steam locomotives or electrification, the latter requiring much more capital, but involving the use of much less labor and much conservation of coal.

These and other questions hinge upon the decisions Congress must make as to the conditions under which the railroads will operate in future. Until they are settled no comprehensive program of railroad rehabilitation and improvement can be undertaken. Only the really important buying of steel can occur. There have been various estimates of the proportion of the total steel output which the railroads "normally consume," these estimates generally ranging from 20 to 40 per cent; but necessarily they all refer to periods in which the railroads are really doing their work and preparing for their future work. To maintain the railroads in physical condition to handle the present limited volume of traffic, which apparently is all the Railroad Administration considers it its duty to do just now, does not require much steel, certainly not enough to engage even 20 per cent of the steel industry's capacity. Railroad orders for steel must be placed even when there is disagreement between the Industrial Board and the Railroad Administration, and with an agreement there would be a larger volume; but even that quantity must be small compared with the steel that would be required if Congress did its duty and enacted a basis for the railroads to operate in future and provide adequate facilities for the proper development of the country.

## Is Unemployment Overstated?

What are the facts as to the number of the unemployed? That there is short time where formerly overtime was the rule is by no means unusual at metal-working plants. Nor is it rare to find a company shortening each of two shifts to spread the available work over the largest possible number of employees. This is done to hold the skilled and faithful force over a dragging interval that is not expected to be more than a breathing spell. Not all shops are thus handicapped. Some are much more active.

Plants like the Springfield Armory, at Springfield, Mass., exclusively on war work, have their forces halved. But it must be remembered that these men for the most part were not employed at war work until military needs and unusual rewards quickly recruited them for the great army of munition producers. Many of such employees have now gone back to farm and store. It by no means follows that in leaving the one position they have found no other.

Of course the problem of caring for the returning soldiers is at hand and certainly it is more pressing than the planning of parades, desirable as are these formal welcomes of homecoming expeditionary forces, in spite of their tendency to increase unemployment. But is there not a tendency to exaggerate the figures of unemployment? A New England manufacturer of machine tools asks the question seriously, believing that the records of the Government bureaus have too often been padded, innocently enough, by listening to the assertions of those eager to make a showing of widespread idleness. On a trip to the West

he passed through Cleveland and stopped there long enough to make inquiry regarding the report of 65,000 or more employees being thrown out of work in that city. His findings were far from supporting the official figures of idleness and he is naturally skeptical of other reports.

On the other hand it is to be said that the hardship of unemployment is less felt than in any previous period of slackened industrial operations. Savings accounts have accumulated in many districts to a degree unprecedented and the amount of public relief of men without work is small.

## Women Workers and Accident Risk

Students of workmen's compensation have taken advantage of the employment of women on a large scale in manufacturing industry to compare the relative degree of accident risk of the sexes. No statistics are available, but from observations made, taking into account the relative hazards of employment, the opinion has been reached that no great difference exists as to accident risk. Women, of course, are more commonly employed on light work. Of those who operate machinery, by far the larger number work on presses. With these they suffer fewer small injuries than the male employees, because the latter, being mostly boys, are less careful, less machine-like in their movements and less attentive to their tasks. The males "fool" more than the females. Unless women are attired with full regard to their employment, as for instance, in trousers and with hair bound up when around machinery, their hazard is increased greatly as compared with men, but in factories organized for safety of employees there is rigid insistence in the matter of clothing.

One hazard of the women has come to be well recognized—the hazard of panic. An accident in a room full of women often causes an epidemic of fainting fits, and to lose consciousness among machines invites accident.

## American and British Tin Plate

American tin-plate makers, as a result of war conditions, have been called upon to furnish nearly one-half of the principal world consumption of this material. Statistics on another page of this issue show how this trade has been divided between Great Britain and the United States, both before and after the war. In 1913 and 1914 British tin-plate exports were nearly eight times those of the United States. As the war progressed the American exports increased from 50 per cent of the total to an amount in 1918 slightly greater than the exports from Great Britain, which in the same interval had fallen to one-half the shipments of 1913 and 1914. In this connection it is interesting to note that the total export movement of tin plate from the two countries did not fall off materially in the four war years as compared with 1913 and 1914. British and American exports before the war were about 575,000 tons per year, while during the war the average was 490,000 tons per year.

Export statistics for the first two months of 1919 show that tin-plate shipments from the United States have averaged over 24,500 tons per month, as against 21,544 tons per month in 1918. However, British exports have dropped, the average to March 1 this year having been only a little more than 16,000 tons per month, while the 1918 rate was 18,625 tons per month.

It would be gratifying if all or a considerable part of this valuable trade which American tin plate manufacturers have built up could be retained. American exports of tin plate had been growing for a number of years before the war and the building of an American merchant marine will be no small factor in their further increase. To-day a handicap exists in the fact that American makers must buy their tin in a controlled market. The American price for tin is still fixed at 72.50 cents per pound and has been held at that figure since early November, while the British makers can purchase the metal at nearly 25 cents per pound less and have been able to do so for several months. The difference thus represented in the cost of a 100-pound box of tin plate would give the American product little chance in competition, even though American sheet bars have been sold in the British market. The prolongation of Government control in tin so long after the ending of the war is seriously open to question and represents another instance in which the Washington policy is detrimental to domestic industry in this difficult transition period.

The recent referendum taken by the Chamber of Commerce of the United States on several important questions indicates clearly the strong sentiment in favor of Congress taking action in regard to anti-trust legislation and also in favor of having general business conduct supervised by the Federal Trade Commission, with an enlargement in membership to nine. There will be no disposition on the part of business men in general to question the correctness of the sentiments expressed through the referendum, but at the annual meeting of the chamber to be held at St. Louis next week, it will have a difficult problem in outlining, for the benefit of Congress, what kind of anti-trust legislation should be enacted. As to the membership of the commission, the number is not so important as the ability and character of the members. If the convention can devise some method of insuring the appointment of men of the highest type to this important commission it will render a real service.

The Electric Hoist Manufacturers' Association has elected the following new officers: Chairman, C. W. Beaver, Yale & Towne Mfg. Co., New York; vice-chairman, J. B. Adams, Franklin Moore Co., Winsted, Conn.; secretary-treasurer, W. C. Briggs, Shepard Electric Crane & Hoist Co., New York; executive committee, the above officers and S. H. Libby, Sprague Electric Works, Bloomfield, N. J., and A. J. Barnes, Shepard Electric Crane & Hoist Co., Montour Falls, N. Y.

The annual meeting of stockholders of the Firth-Sterling Steel Co. will be held at McKeesport, Pa. on Thursday, June 5, for the purpose of voting for, or against, a proposed increase in the preferred capital stock of the company from $500,000 to $1,000,000, and the transaction of such other business as may properly come before the meeting.

## PITTSBURGH BASIS

### Comptroller Warwick Makes Ruling as to Supplemental Contracts

WASHINGTON, April 22.—Although Comptroller Warwick of the Treasury has ruled that where a Government war price fixing board fixed prices "f.o.b. Pittsburgh basis," Government departments would be allowed to make their payments on the regularly accepted trade interpretation of that term, he has handed down a further ruling forbidding entering into supplemental contracts to make this additional allowance in contracts which did not originally contain such a clause.

**The First Ruling**

The first ruling was made in a letter to the Secretary of War, and declares that the payment of a price fixed on the Pittsburgh basis may be questioned, but that the responsibility for it falls upon the price fixing board which stipulated such a price and therefore the payment is permissible as far as the comptroller's office is concerned.

"I assume," declares the letter of Comptroller Warwick to Secretary Baker, "that in addition to the provision of the contract fixing the price of the commodity on a basis point, as stated in your letter, other provisions stipulate for delivery at some other point either named or the manufacturer's plant generally, and that shipment is to be made to a point designated or as may be designated from time to time, the Government to pay the freight. The condition prescribed is that while shipment in fact takes place between two points, payment for the commodity is to be made at a price equal to the cost to the Government if shipment had been made from some other point, so that the contractor will receive in addition to the basis point or tentative price an amount equal to the freight from the basis point to destination less the freight from shipping point to destination or suffer a reduction if that should result in any case.

"The price thus made up shows on its face it lacks a *quid pro quo*—that the contractor is to receive in part something for which nothing is given—the difference in the amount of the freight between the respective points, one point at least being unknown when the contract is made. Its purpose can only have reference to the relations between manufacturers of the particular commodity, and has no reference to the necessities of the other contracting party.

"The authority for paying a price so fixed may well be questioned, but where the price was made in this form by one of the Government war price fixing boards during the war emergency, the responsibility therefor must be upon such board."

The latest controversy over this issue, however, arose in the payment for 15,000 tons of Bessemer screw steel sold by the American Steel & Wire Co., "f.o.b. contractor's plant." This steel was delivered Sept. 30, 1918, but on Jan. 21, 1919, a supplemental contract was made which changed the price basis to "f.o.b. cars, Pittsburgh, Pennsylvania, basis." The voucher for the original amount, however, was paid Oct. 15, 1918.

**Supplemental Contract**

"The so-called supplemental contract of Jan. 21, 1919," ruled Comptroller Warwick, in another letter to Maj. Sam Alexander, disbursing officer of the Signal Corps at New York, "is therefore an attempt to interpret the terms of a contract contrary to the interpretation placed upon it at the time that payment was made and accepted. If the so-called supplemental contract changes the consideration fixed by the original contract, it is without consideration and void; if it is a proper interpretation of said contract, it is unnecessary. In any event it must be wholly disregarded. A claim for money alleged to be due under a contract is not to be settled and adjusted by means of a supplemental contract. The payment for this material having already been made by you, a claim for any additional amount to which the contractor considers himself entitled should be presented to the Auditor for the War Department, who is authorized to settle the same. You are not authorized to pay the amount as submitted."

## CONTENTS


Pulverized Coal in Canadian Steel Plant..... 1065
Strange Compounds in Blast Furnace Bears..... 1069
Adjusting War Contract Claims..... 1070
The Vom Baur Electric Steel Furnace..... 1071
Ore Bills in Minnesota Defeated..... 1073
Dial Test Indicator..... 1074
Italy's War Buying of American Steel..... 1075
United States Foreign Trade Grows..... 1077
Manganese Imports in January and February..... 1078
Spinning Machine for Tubing..... 1078
Hot Deformation and the Quality of Steel..... 1079
Heavy Duty Planer..... 1082
Phosphorus in Malleable Iron..... 1082
American Gear Manufacturers' Association..... 1083
Joint Convention of American Drop Forge and Drop Forge Supply Associations..... 1085
Meeting of Chamber of Commerce of the United States. 1085
Bureau of Welding Organized..... 1085
New French Steel Capacity..... 1086
How the French Make Ferrocerium..... 1086
Machine-Tool Exports..... 1086
Armament and Ammunition for British Naval Craft... 1087
Horizontal Boring and Drilling Machine..... 1088
The Krupp Plant and Peace Conditions—Krupp Probably Bankrupt..... 1088
Judge Gary Reviews Business Conditions—Little Hope at Washington for Price Stabilization..... 1089
American and British War Exports of Tin Plate..... 1090
Constructive Labor Program Demanded..... 1091
Steel for Gears..... 1092
Editorials:
Extent of Readjustment—Settle the Railroad Question—Is Unemployment Overstated?—Women Workers and Accident Risk—American and British Tin Plate..... 1094-1096
Ruling Concerning Pittsburgh Basis..... 1097
Industrial Exhibition at Brooklyn..... 1097
Victory Liberty Loan..... 1098
Central Steel Co.'s Extensive Plans..... 1098
High War Prices..... 1098
Surplus Locomotive Cranes..... 1098
Bankers Make Offer for Otis Steel Co. Stock..... 1099
Export Restrictions on Sheets Eliminated..... 1099
Charles E. Hildreth in Charge of Machine Tool Sales... 1099
National Metal Trades Association Meets..... 1099
Ball Bearing Manufacturers Combine..... 1099
Poland to Spend $450,000,000 Here..... 1099
Iron and Steel Markets..... 1100
Prices Finished Iron and Steel, f.o.b. Pittsburgh..... 1112
Metal Markets..... 1113
Personal..... 1114
Obituary..... 1115
Electric, Open-Hearth and Converter Steel Castings.... 1116
Test of Colloidal Fuel..... 1116
Book Reviews..... 1117
Machinery Markets and News of the Works..... 1118
Ocean Rates on Machine Tools..... 1127
Current Metal Prices..... 1128


## Industrial Exhibition at Brooklyn

Among the companies which will be represented at the industrial, mechanical and architectural exhibition which will be held under the auspices of the Brooklyn Engineers Club from April 28 to May 3, inclusive, at the Twenty-third Regiment Armory, Bedford and Atlantic Avenues, Brooklyn, are the following:

American Abrasive Metals Co., Air Reduction Co., oxy-acetylene welding equipment; Adriance Machine Co., sheet metal presses; Atlantic Basin Iron Works, Bay Ridge Sheet Metal Co., W. N. Best Co., oil burners and furnaces; E. W. Bliss Co., sheet metal presses; Booth Felt Co., gaskets, etc.; Brooklyn Fire Brick Works, Brooklyn Iron Works, William Cabble Excelsior Wire Works, Continental Iron Works, William M. Crane Co., gas stoves, castings; C. Cunningham Co., boilers; Davidson Tool Mfg. Co., De Haven Mfg. Co., steel hoops; Doehler Die Casting Co., William S. Doig Estate, machinery; Richard Dudgeon, hydraulic jacks, etc.; Estey Brothers Wire Works, Fulton Foundry & Machine Co., castings; Gehnrich Indirect Heat Oven Co., P. H. Gill & Sons, machinery; Thomas Gregory Galvanizing Works, R. Hamilton & Sons, brass foundry; John Hassell, Inc., rivets, nails, etc.; Hay-Budden Manufacturing Co., anvils; Hindley & Pendleton Co., hardware; Charles A. Hones, furnaces; Joshua Horrocks, Inc., wire and iron work; Norman Hubbard's Sons, machinery; International Time Recording Co., Jacobs Brothers, scales; Johnson Brothers, hardware; Kaspar & Koetzle, hardware; Kellar Mechanical Engraving Co., Merrill Brothers, drop hammers, forgings; Metal Package Corporation, Meurer Steel Barrel Co., Miller & Van Winkle, springs; Monroe Calculating Machine Co., Moller & Schumann Co., paints and varnishes; Benjamin Moore & Co., paints; Murcott & Campbell, files; Olsen Iron Works, Thos. Paulson & Sons, Inc., brass castings; Pits & Weber, castings; Pier Machine Works, Inc.; Pittsburgh Water Heater Co., Quigley Furnace Specialties Co., Reliance Paint Co., Rex Paint Corporation, A. Schraeder's Son, Inc., brass fittings; A. B. See Elevator Co., David H. Smith & Sons, Inc., iron and steel; Sperry Gyroscope Co., Surface Combustion Co., Tabulating Machine Co., Chas. J. Tagliabue Mfg. Co., Taylor & Co., castings; P. Trainor Co., boilers; V. & O. Press Co., William Vogel & Brothers Co., Inc., sheet metal products.

# VICTORY LIBERTY LOAN

## Steel Companies Have Unusual Conditions with Which to Contend

It was a steel corporation which made the second largest subscription to the Victory Liberty Loan on April 21, the opening day. The United States Steel Corporation promised to take $25,000,000 of the short-time notes, the only larger subscription in New York being that of the Irving National Bank and Irving Trust Co., for $40,000,000. The initial day of the three weeks' campaign opened very auspiciously, 25 towns in the Second Federal Reserve district, which embraces New York, having subscribed for their quotas upon the first day. Detroit claimed the honor of being the first large city to oversubscribe her quota, unofficial figures giving her $60,000,000, though her quota was $55,494,413. The total subscriptions in the Second Federal Reserve district amounted to more than $100,000,000.

Because of the approximate 50 per cent curtailment in operations of steel plants, it is expected that employers and employees will not be able to respond in such large volume of subscriptions as has characterized other loans. Heavy operating expenses and taxes have drained severely upon cash resources of plants. Thousands of workmen are idle and those who are employed do not have the chance to earn "loan money" from overtime and holiday work, which existed during the war.

Conspicuous among the first day subscriptions were those of the Baldwin Locomotive Works for $1,000,000 and the General Motors Corporation for $3,000,000. One of the principal canvassing branches in New York is the so-called Rainbow Division of the Allied Trades in which are represented the various metal trades. At the head of machinery trades is J. H. Williams of the J. H. Williams Co., Brooklyn; W. H. Taylor, president Iron Age Publishing Co., is chairman of the hardware, metals and allied trades, and is assisted, because of his absence in Europe, by George A. Graham of John H. Graham & Co., New York. The electrical industry committee met at the Machinery Club, 50 Church Street, New York, Monday night, and heard talks by Captain Archie Roosevelt, and others.

At Youngstown, Ohio, in two days of the Victory Loan campaign, Mahoning County subscribed for bonds in excess of $2,000,000, including the following subscriptions: Youngstown Sheet & Tube Co., $500,000; Brier Hill Steel Co., $250,000; Republic Iron & Steel Co., $350,000; United Engineering & Foundry Co., $100,000; W. B. Pollock Co. and employees, $50,000; Truscon Steel Co. employees, $65,350.

The present aim of loan workers now is—not to get the $4,500,000,000 in the appointed three weeks, for all seem confident of raising this amount, but rather—to subscribe the amount within two weeks or even one week.

## Central Steel Co.'s Extensive Plans

The Central Steel Co., Massillon, Ohio, is planning extensions and improvements to its plant that will involve an expenditure of over $900,000, and to provide forms to carry out its plan has called a special meeting of its stockholders to be held May 20 to vote on increasing its capital stock from $5,000,000 to $7,500,000 by increasing its preferred stock from $2,500,000 to $5,000,000. It is the intention to dispose of only enough of the new stock to cover the cost of the proposed plant improvements, the balance to remain in the treasury for future contingencies.

In a notice of the meeting sent to stockholders, the company states that it has increased its furnace capacity from three to 10 furnaces in the four years the plant has been in operation. Other additions have been made that have served to decrease the cost of manufacture and to increase production. The result of this development has been to increase the company's business from $8,000,000 during the year ending June 1, 1916, to nearly $30,000,000 during the year 1918, or nearly 400 per cent in three years. The company announces that it now has over three times its original investment in plant account, the larger part of which was paid out of earnings. In addition to this, its requirements for working capital, which are three or four times the amount needed during the first year of operation, have also been provided from earnings.

## High War Prices

The statistics branch of the general staff of the War Department has compiled some interesting figures to show the high war prices which were paid for the railroad equipment shipped to the American Expeditionary Forces. On the basis of the 1914 prices, the Government paid from two to two and one-half times the pre-war costs. By percentage, the smallest increase was the cost of box cars, with cab, 500 of which were shipped at a price of $2770 each, an increase of 203 per cent over the pre-war price of $1366. The largest increase was in the cost of tank cars which jumped 248 per cent, from $1367 to $3397 each. Locomotive prices went up 245 per cent, from $17,500 to $42,966 each.

The total cost of the 1306 locomotives sent to France was $56,624,870 instead of a pre-war cost of $23,083,500. The cost of the 18,303 freight cars sent to France was $48,822,100, an increase of 214 per cent over the corresponding pre-war cost of $22,346,745. The total cost of the standard gage railway equipment sent to France was $104,446,970, an increase of 230 per cent over the pre-war price of $45,430,245.

## Reunion of "Eighty-niners"

Thirty years ago a party of American engineers, with members of their families, belonging to the national engineering societies, sailed for Europe, visiting England and the Paris Exposition of 1889, and being the recipients of many high courtesies, official, professional and individual. Plans have been made for a reunion dinner, to be held in New York about May 27, at which it is hoped that all the survivors, ladies as well as men, of that memorable trip may meet again.

While the records of the various societies furnish an approximately complete list of the party, it is possible that some have been overlooked, or that addresses may require correction. It is therefore urgently requested that anyone who was of that party communicate immediately with Jesse M. Smith, secretary of the committee, at the Engineer's Club, 32 West Fortieth Street, New York. This information is desired from every member of the party, whether attendance at the function is possible or not; those who cannot come will be heartily remembered when their letters are read. Henry R. Towne is chairman, and Jesse M. Smith is secretary of the reunion.

## Surplus Locomotive Cranes

WASHINGTON, April 22.—The Government's surplus locomotive cranes—with a present market value between $3,000,000 and $4,000,000—held by the Division of Military Railways, will be turned over to the Railroad Administration. The price at which this transfer is to be made has not yet been made public. The division has already turned over 50,000 tons of 80-lb. standard rail to the Railroad Administration, thereby eliminating it from the War Department's lists of surplus materials.

In the meantime the Director of Sales is trying to complete his inventories of surplus war department materials, but with little encouragement in the way of speed. Even the scrap figures are still far from complete. A conference is to be held Friday with representatives of the American Iron and Steel Institute to discuss the disposition of this material. Similar conferences are scheduled with the officials of the American Board of Scrap Iron Dealers and the associations of waste material dealers.

Patriarche & Bell, New York, jobbers in iron and steel, have removed their offices and warehouse from 215 Pearl Street to 351 West Street, corner of Clarkson Street, after nearly 20 years at their former location downtown.

## Bankers Make Offer for Stock of Otis Steel Co., Cleveland

William Salomon & Co., 25 Broad Street, New York, bankers, have offered to purchase the Otis Steel Co., Cleveland, suggesting the payment of $210 per share for the $4,800,000 common stock, and $120 per share for the $2,400,000 preferred. According to J. Weinberger, partner of the negotiating firm, British stockholders hold 75 per cent of the capital stock, and to lay the matter before them Elisha Walker of William Salomon & Co. spent seven weeks in England, having returned Tuesday. The next step will be the gathering of the stockholders, but when and where the meeting will be held has not been announced. He said that in case the deal is put through, there will be no change in management or in character of output and the company will still specialize on the manufacture of boiler plate.

The Otis Steel Co. has two works at Cleveland, the Lakeside and the Riverside. The first has an annual capacity of 20,000 tons of acid and 90,000 tons of basic open-hearth ingots, 25,000 tons of steel castings for sale, 70,000 tons of sheared plates and 5000 tons of forgings. The Riverside works makes annually, when running at full capacity, 65,000 tons of light plates and 35,000 tons of sheets.

### Export Restrictions Eliminated

WASHINGTON, April 22.—The War Trade Board today announced that tin plates, terne plates and galvanized sheets and manufactures thereof have been added to the free list for exportation to Denmark, Norway, Sweden, European Holland, Switzerland, Finland, Luxemburg and the occupied Rhine territory. It has also amended the free list item "machinery of all kinds" to read "machinery of all kinds and parts except textile machinery and machinery wholly or mainly made of copper or brass, including tractors for agricultural purposes."

Consul General Skinner at London has cabled that the British government has removed the import restrictions on the following tools and implements: Manure forks, hand cultivators, hay forks, corn forks, potato hooks, digging forks, sheep shears, hoes, garden shears, rakes, steel headed scythes, pruning hooks, awl blades, manure drags, axes, hay knives, hatchets, pliers for sheep choppers, bill hooks, cleavers.

### New Engineers' Club

An Engineers' Club has been organized at Youngstown, Ohio, with nearly 550 charter members, made up largely of mechanical and civil engineers and others connected in official capacities with the various blast furnaces and steel companies in the Mahoning and Shenango valleys. The new club is planning the erection of a building to contain the usual club facilities.

No. 4 blast furnace of the Carnegie Steel Co. at Farrell, Pa. was blown out last week for relining. Out of 46 blast furnaces in the Mahoning and Shenango valleys, no less than 20 are now idle, either for relining, or on account of the condition of the market.

The Elliot-Blair Steel Co., New Castle, Pa., maker of cold rolled strip steel, which will build a plant at Mercer, Pa., states that at this time no definite plans have been made for this new plant, or for the equipment that will be needed.

Public hearings on the proposed industrial lighting code in Ohio will be held at the Hotel Hollenden, Cleveland, April 30, and at the Hotel Ohio, Youngstown, May 2, both starting at 9:30 a. m.

The tin plate plant of the American Sheet & Tin Plate Co., Sharon, Pa., has closed down for two weeks for repairs.

## Charles E. Hildreth in Charge of Machine Tool Sales at Washington

WASHINGTON, April 22.—Charles E. Hildreth has been appointed to take charge of the machine tool section of the division of surplus property in the War Department. He served as a dollar-a-year man in the finished products division of the War Industries Board and is intimately acquainted with the machine tool business, being president of the Whitcomb-Blaisdell Machine Tool Co., Worcester, Mass., and general manager of the National Machine Tool Builders' Association. His appointment is the first step in the reorganization of the War Department machinery for the disposition of surplus machine tools.

### National Metal Trades Association Meets

The National Metal Trades Association opened its twenty-first annual convention at the Hotel Astor, New York, Wednesday morning, April 23. The convention was preceded on Monday and Tuesday by meetings of the executive committee, local secretaries, administrative council, and on Tuesday evening there was the customary alumni banquet. The convention sessions opened Wednesday morning. Among the speakers scheduled to appear is William C. Redfield, Secretary of Commerce, who will discuss "Work of the Department of Commerce and Its Relation to Business," at the afternoon session to-day (Wednesday). Howard Coonley, vice-president Emergency Fleet Corporation, will also deliver an address. A report of the convention will appear in the next issue of THE IRON AGE.

### Ball Bearing Manufacturers Combine

Four leading manufacturers of ball bearings, the S K F Ball Bearing Co., Hartford, Conn., and New York; the Hess-Bright Mfg. Co., Philadelphia; the Atlas Ball Co., Philadelphia, and the Hubbard Machine Co., Worcester, Mass., have consolidated under the name of the S K F Industries, Inc. The merger takes effect May 1. The new company will offer a comprehensive line of ball bearings, including the Hess-Bright deep-groove type, the S K F self-aligning radial and thrust bearings and ball-bearing pillow blocks and shafting hangers. Officers of the S K F Industries, Inc., will be as follows: B. G. Prytz, president; W. L. Batt, vice-president; J. P. Walsh, comptroller, and S. B. Taylor, sales manager. The principal office will be at 165 Broadway, New York, with branches in Boston, Philadelphia, Atlanta, Buffalo, Cleveland, Detroit, Cincinnati, Chicago and San Francisco.

### Poland Will Spend $450,000,000 Here

Poland will purchase more than $450,000,000 worth of supplies, including iron, steel and machinery, in the United States within the next year, according to E. Corwin-Levinski of the Polish National Depot, who made an address last week before the Society of Polish Engineers and Merchants at the Engineering Societies Building, New York. Mr. Corwin-Levinski based his statement on information obtained from the economic section of the Polish delegation to the Peace Conference in Paris. He said that credits would be arranged, plans for which will be announced soon in Warsaw or in Paris. Immediate needs of Poland will include $120,000,000 worth of machinery and allied equipment; $140,000,000 worth of raw materials for metal, mineral, chemical and textile industries; $60,000,000 worth of agricultural machinery; some railroad rolling stock and other miscellaneous supplies.

Information regarding markets in Bohemia may be obtained, according to C. E. Drayer, secretary American Association of Engineers, by addressing Louis Jalovec, who has been appointed assistant to the United States Foreign Trade Commissioner at Czechoslovakia. He will be stationed at Prague, Bohemia.

# Iron and Steel Markets

## FURTHER CURTAILMENT

### An Open Market but No Price Weakness

#### Heavy Advances in British Prices—Reduction in Lake Ore Rates

The open market that has existed recently in steel products has not been generally recognized because it did not show widespread and sensational price cutting. The industry, without any concert, has been limiting operations to the business coming in. In the past week that has meant further shutting down of blast furnaces and curtailment of working time at steel works.

Generally a 50 per cent operation or somewhat less is indicated among independent companies. The Steel Corporation is on a 70 per cent basis in the Chicago district and is nearer to 60 per cent in Pittsburgh and the Valleys.

Most blast furnaces are still piling iron. Of the Carnegie Steel Co.'s 59 furnaces, 26 are idle. In the Mahoning and Shenango valleys 20 are idle out of 46.

Little interest has been taken in the bulletins of further parleys over prices at Washington. The steel trade has regarded the stabilizing episode as ended when executive approval was withheld from prices in which the Government had asked the public to have confidence.

The deviation from the so-called official prices are small and are the exception. New business is on so limited a scale that price cutting has little motive, and since costs increase as output falls off, the chances of the much heralded deep cuts have grown less. The belief that output has now reached or even gone below a bare wear and tear basis has even given rise to a more cheerful feeling, particularly in the Chicago district.

All the large steel companies have maintained wages. In some communities where an iron or steel plant was the chief dependence workmen have accepted some reduction in wages to prevent a shutdown. A Southern steel company has reduced wages 15 per cent. Some blast furnace reductions have come also.

Of the 1,200,000 tons of low-priced rails on the books of the mills Jan. 1, considerably more than half has been rolled, and the steel companies have already adjusted their expectations to limited railroad buying in the remainder of the year.

The Navy Department has closed bids on 25,000 tons of armor plate for four battleships. Orders are still withheld on the 25,000 tons of finished steel for the Navy—plates, shapes and bars—on which identical bids were made by various producers April 4. The official statement is that orders are held up awaiting a "readjustment in prices."

Demand for wire and wire fencing is better, with some mills behind in shipments of barbed wire. Some shading is noted in cement-coated nails, about 10 cents per keg.

Business in tin plates for delivery beyond July 1 has been booked at a price to be fixed later, deliveries for the intervening period going at the base price of $7 per box.

Following the advance of $10.50 in pig iron by British makers announced last week, effective May 1, our cable now tells of advances in England for the home trade of $14 per ton in plates, $11.65 per ton in steel bars and $7.50 in steel rails. British export prices are also no longer under government control, but are subject to individual negotiation. Under the new quotations, mill prices of plates are $79.22, compared with $59.36 per gross ton in the United States. Bars there are $88.54 and here $52.64. Rails in England are $69.90; in this country $45.

How much ocean carrying charges absorb this difference is indicated in the search, not yet successful, by a New York export house for a quotation of $52.50, delivered New York, on 6000 tons of plates to meet English competition.

The movement of pig iron from furnaces to foundries is sluggish. Foundry operations are irregular. So much machinery is ahead of the trade—hundreds of millions of dollars worth left on the Government's hands, which must eventually come on the market—that the prospects for gray iron foundries are not particularly bright. Stove foundries have fared rather better of late, however.

Cast-iron pipe foundries have bought a little pig iron in the past week, just enough to take care of contracts as they came in.

One effect of the accumulations of ore in furnace yards, as steel works and blast furnace operations have been curtailed throughout the country, has been the holding back of the ore movement. A number of Lake Superior iron ore producers will delay the starting of vessels until May 15 or later. The stoppage of work at the Bethlehem Steel Co.'s Cuban iron mines is from the same cause.

Lake charges on ore have been reduced 20 cents per ton, but if the movement is successful in putting the unloading charge back to 15c., the net reduction will be 15 cents.

## Pittsburgh

PITTSBURGH, April 22.—(*By Wire.*)

Local feeling is that nothing tangible will come of proposed further conferences in Washington between the Industrial Board and the Director General of Railroads. Even should the Railroad Administration accept present prices on rails, or even lower prices, if such were to be made, it is held here that it hardly follows that it would at once place large contracts for rails, but on the contrary, Director General Hines might adopt the policy of placing orders only for such quantities of rails as would meet urgent needs, and the quantities thus placed might be very small and would probably not materially affect the market.

It is surprising how well the steel companies are maintaining the schedule of prices agreed upon at Washington on March 20. While it is true that the amount of new business that has come out since then has not been large enough really to test the strength of the prices, yet it is known positively that local steel companies have turned away business offered at lower prices.

The local situation is as quiet as it could be, but there is a fair amount of new buying in small lots for

# A Comparison of Prices

**Advances Over the Previous Week in Heavy Type, Declines in Italics**

At date, one week, one month, and one year previous

## For Early Delivery

| Pig Iron, Per Gross Ton: | Apr. 22, 1919 | Apr. 15, 1919 | Mar. 25, 1919 | Apr. 23, 1918 |
|---|---|---|---|---|
| No. 2 X, Philadelphia‡ | $31.90 | $31.90 | $31.90 | $34.25 |
| No. 2, Valley furnace† | 26.75 | 26.75 | 26.75 | 33.00 |
| No. 2, Southern, Cincin† | 30.35 | 30.35 | 30.35 | 35.90 |
| No. 2, Birmingham, Ala† | 26.75 | 26.75 | 26.75 | 33.00 |
| No. 2, furnace, Chicago* | 26.75 | 26.75 | 26.75 | 33.00 |
| Basic, deliv., eastern Pa. | 29.65 | 29.65 | 29.65 | 32.75 |
| Basic, Valley furnace | 25.75 | 25.75 | 25.75 | 32.00 |
| Bessemer, Pittsburgh | 29.35 | 29.35 | 29.35 | 36.15 |
| Malleable, Chicago* | 27.25 | 27.25 | 27.25 | 33.50 |
| Malleable, Valley | 27.25 | 27.25 | 27.25 | 33.50 |
| Gray forge, Pittsburgh | 27.15 | 27.15 | 27.15 | 32.75 |
| L. S. charcoal, Chicago | 38.85 | 38.85 | 38.85 | 37.50 |
| **Rails, Billets, Etc.,** | | | | |
| Per Gross Ton: | | | | |
| Bess. rails, heavy, at mill | 45.00 | 45.00 | 45.00 | 55.00 |
| O-h rails, heavy, at mill | 47.00 | 47.00 | 47.00 | 57.00 |
| Bess. billets, Pittsburgh | 38.50 | 38.50 | 38.50 | 47.50 |
| O-h billets, Pittsburgh | 38.50 | 38.50 | 38.50 | 47.50 |
| O-h sheet bars, P'gh | 42.00 | 42.00 | 42.00 | 51.00 |
| Forging billets, base, P'gh. | 51.00 | 51.00 | 51.00 | 60.00 |
| O-h billets, Phila | 42.50 | 42.50 | 42.50 | 50.50 |
| Wire rods, Pittsburgh | 52.00 | 52.00 | 52.00 | 57.00 |
| **Finished Iron and Steel,** | | | | |
| Per Lb. to Large Buyers: | Cents | Cents | Cents | Cents |
| Iron bars, Philadelphia | 2.595 | 2.595 | 2.595 | 3.685 |
| Iron bars, Pittsburgh | 2.35 | 2.35 | .... | 3.50 |
| Iron bars, Chicago | 2.50 | 2.50 | 2.62 | 3.50 |
| Steel bars, Pittsburgh | 2.35 | 2.35 | 2.35 | 2.90 |
| Steel bars, New York | 2.62 | 2.62 | 2.62 | 3.095 |
| Tank plates, Pittsburgh | 2.65 | 2.65 | 2.65 | 3.25 |
| Tank plates, New York | 2.92 | 2.92 | 2.92 | 3.445 |
| Beams, etc., Pittsburgh | 2.45 | 2.45 | 2.45 | 3.00 |
| Beams, etc., New York | 2.72 | 2.72 | 2.72 | 3.195 |
| Skelp, grooved steel, P'gh. | 2.45 | 2.45 | 2.45 | 2.90 |
| Skelp, sheared steel, P'gh. | 2.65 | 2.65 | 2.65 | 3.25 |
| Steel hoops, Pittsburgh | 3.05 | 3.05 | 3.25 | 3.50 |

*The average switching charge for delivery to foundries in the Chicago district is 50c. per ton.
†Silicon, 1.75 to 2.25. ‡Silicon, 2.25 to 2.75.

| Sheets, Nails and Wire, | Apr. 22, 1919 | Apr. 15, 1919 | Mar. 25, 1919 | Apr. 23, 1918 |
|---|---|---|---|---|
| Per Lb. to Large Buyers: | Cents | Cents | Cents | Cents |
| Sheets, black, No. 28, P'gh. | 4.35 | 4.35 | 4.35 | 5.00 |
| Sheets, galv., No. 28, P'gh. | 5.70 | 5.70 | 5.70 | 6.25 |
| Wire nails, Pittsburgh | 3.25 | 3.25 | 3.25 | 3.50 |
| Cut nails, Pittsburgh | 4.25 | 4.25 | .... | 4.00 |
| Fence wire, base, P'gh | 3.00 | 3.00 | 3.00 | 3.25 |
| Barb wire, galv., P'gh | 4.10 | 4.10 | 4.10 | 4.35 |
| **Old Material,** | | | | |
| Per Gross Ton: | | | | |
| Carwheels, Chicago | 21.00 | 21.00 | 21.00 | 29.00 |
| Carwheels, Philadelphia | 23.00 | 23.00 | 23.00 | 29.00 |
| Heavy steel scrap, P'gh | 15.00 | 15.00 | 14.00 | 28.50 |
| Heavy steel scrap, Phila | *15.00* | 15.50 | 15.00 | 28.00 |
| Heavy steel scrap, Chicago | *15.75* | 16.50 | 16.00 | 28.50 |
| No. 1 cast, Pittsburgh | 18.00 | 18.00 | 18.00 | 29.00 |
| No. 1 cast, Philadelphia | 22.00 | 22.00 | 22.00 | 29.00 |
| No. 1 cast, Ch'go, net ton | *20.00* | 21.50 | 22.00 | 27.50 |
| No. 1 RR. wrot., Phila | *21.00* | 22.00 | 21.00 | 54.00 |
| No. 1 RR. wrot., Ch'go, net | *15.50* | 16.00 | 16.00 | 29.75 |
| **Coke, Connellsville,** | | | | |
| Per Net Ton at Oven: | | | | |
| Furnace coke, prompt | $3.50 | $3.50 | $4.00 | $6.00 |
| Furnace coke, future | 4.00 | 4.00 | 4.25 | 6.00 |
| Foundry coke, prompt | 4.00 | 4.00 | 4.75 | 7.00 |
| Foundry coke, future | 4.50 | 4.50 | 5.50 | 7.00 |
| **Metals,** | | | | |
| Per Lb. to Large Buyers: | Cents | Cents | Cents | Cents |
| Lake copper, New York | 15.50 | 15.50 | 15.37½ | 23.50 |
| Electrolytic copper, N. Y. | 15.25 | 15.25 | 15.12½ | 23.50 |
| Spelter, St. Louis | 6.05 | 6.15 | 6.17½ | 6.62½ |
| Spelter, New York | *6.40* | 6.50 | 6.52½ | 6.87½ |
| Lead, St. Louis | 4.95 | 4.95 | 4.95 | 6.75 |
| Lead, New York | *4.70* | 4.75 | 5.20 | 6.90 |
| Tin, New York | 72.50 | 72.50 | 72.50 | 88.00 |
| Antimony (Asiatic), N. Y. | *6.50* | 6.62½ | 6.25 | 12.75 |
| Tin plate, 100-lb. box, P'gh. | $7.00 | $7.00 | $7.00 | $7.75 |

prompt shipment, this representing urgent needs of customers only, and applies to the whole iron and steel list. Consumers of pig iron would not think of buying ahead under present conditions, but come in the market and buy an occasional lot of iron for prompt delivery, and then retire until they need some more. This is also true of steel and finished products.

The rate of operation among steel works and blast furnaces seems to be getting steadily less, it being the policy to shut down blast furnaces and steel plants when there are not enough orders on which to run rather than pile stocks. In the Mahoning and Shenango valleys there are 20 furnaces idle out of a total of 46. The Carnegie Steel Co. has 33 furnaces going and 26 idle, the largest number of furnaces this concern has had out of blast for a very long time. Steel works operations are on about a 50 per cent basis, with a few of the larger concerns running at about 60 per cent, or a little better. So far as can be learned there have been no general wage reductions, except those that are affected by a sliding scale. The opinion is that the summer in the steel trade will be quiet, but the fact remains that the demand for steel is picking up heavily, and when it does come, will tax the capacity of the mills to meet it.

**Pig Iron.**—A sale is noted of 250 tons of foundry iron to a Johnstown, Pa., radiator interest, and a local inquiry is in the market for 300 tons of Bessemer iron, on which several local concerns have quoted a regular price of $27.95, Valley furnace, but whether this price will bring the business is not known. Blast furnaces in the Pittsburgh, Youngstown and Wheeling districts are steadily going out of blast, the steel companies seizing the present quiet condition to reline and repair their furnaces, so that they will be in the best physical shape when the demand for iron comes. Regular prices are being quoted on the very small lots being inquired for, but if a consumer came in the market for a round lot of pig iron, it is likely he could do better than the regular price. We quote as follows:

Basic pig iron, $25.75; Bessemer, $27.95; gray forge, $25.75; No. 2 foundry, $26.75; No. 3 foundry, $26.25; and malleable, $27.25; all per gross ton at Valley furnaces, the freight rate for delivery in the Cleveland and Pittsburgh districts being $1.40 per ton.

**Ferroalloys.**—Prices on resale ferromanganese are steadily going down, a Youngstown consumer having bought last week two cars, or about 60 tons, at $110 delivered, for 80 per cent. Furnaces making ferromanganese still hold their price at $150 delivered, but cannot sell any material at that figure, the supply of resale being fairly large. Consumers of ferromanganese and ferrosilicon are carrying pretty heavy stocks and their consumption is cut down a good deal by light operations.

We quote 78 to 82 per cent resale ferromanganese at $110 to $115, delivered, with a reduction of about $2 per unit for lower percentages. We quote resale 50 per cent ferrosilicon at $90 to $95 and resale 18 to 22 per cent spiegeleisen at $35, delivered. Prices on Bessemer ferrosilicon are: 9 per cent, $43; 10 per cent, $45; 11 per cent, $48; 12 per cent, $51. We quote 6 per cent silvery iron, $35; 7 per cent, $36; 8 per cent, $38.50; 9 per cent, $40.50, and 10 per cent, $47, but some sellers still adhere to quotations on a basis of $36.75 for 6 per cent and usual differentials. About $3 per gross ton advance is charged for each 1 per cent silicon for 11 per cent and over. All the above prices are f.o.b. maker's furnace, Jackson or New Straitsville, Ohio, which have a uniform freight rate of $2.90 per gross ton for delivery in the Pittsburgh district.

**Billets and Sheet Bars.**—Steel mills that are furnishing billets to consumers who manufacture automobile parts report that these concerns are taking out steel very freely, but the consumption of sheet bars by the sheet and tin plate mills is not runing much over 50 per cent of normal. Offers have been made recently to shade steel prices, but this did not bring out business. Finishing mills are running at light capacity, and this accounts for the slack demand for steel.

We quote 4 x 4 in. soft Bessemer and open-hearth billets at $38.50, 2 x 2 in. billets at $42; sheet bars, $42; slabs, $41, and forging billets $51 base, all f.o.b. at mill, Pittsburgh or Youngstown.

**Plates.**—A local mill is just about completing shipments of about 25,000 tons of plates, shapes and bars to the American Car & Foundry Co., which took some time ago a contract for 10,000 cars for export to the

Italian State Railways. These cars are small, taking about 2½ tons of steel per car. There are no signs of any contracts for cars being placed by domestic roads, and the two local steel car companies are short of work, and running at a greatly reduced rate. The Carnegie Steel Co. made and shipped last month over 126,000 tons of plates, mostly for boats for the Emergency Fleet Corporation. Some of the smaller plate mills are not operating to more than 50 per cent, and may have to close down soon, unless demand gets better, and there are no signs of this. We quote ¼-in. and heavier sheared plates at 2.65c. at mill, Pittsburgh.

**Structural Material.**—No new jobs of any moment were placed with local fabricators in the past week, and new inquiry is very light. Railroads are buying only in small lots for necessary repairs, and have practically no new work under way.

We quote beams and channels up to 15 in. at 2.45c. at mill, Pittsburgh.

**Iron and Steel Bars.**—Consumers of iron and steel bars are placing only small orders for prompt shipment to cover actual needs and are not disposed to contract ahead. Specifications are coming in at a fair rate, but in a good many cases shipments are being held up or else are being cut down very materially. There is some unevenness in prices on both iron and steel bars, but it is said this does not represent more than about $2 per ton.

We quote soft steel bars rolled from billets at 2.35c.; from old steel rails, 2.45c. Bar iron is quoted at 2.35c. for Eastern shipment and 2.55c. for Western shipment.

**Sheets.**—The consuming trade is buying only such quantities of sheets as actual needs demand, the only exception being the automobile trade, which has been buying freely for some time. Some mills whose output goes largely to automobile builders, report they are well sold up over the next 60 days or longer. General sheet mill operations are down to about a 50 per cent basis. Some mills close down entirely for one week until orders accumulate and then run the next week. It is said prices on sheets are being firmly held by the mills, but there is some shading among jobbers who desire to move their stocks out more freely. Prices on sheets are given on page 1112.

**Tin Plate.**—The demand for tin plate is looking up, some consumers deciding that they can not safely wait any longer and are placing orders for their needs up to July 1. On such contracts the full price of $7 per base box applies and on business booked for delivery beyond July 1 the price is to be fixed later. Some tin plate is being offered by jobbers and from other sources at 50c. or more per base box under the regular price for prompt shipment, but the quantity is not large. We quote tin plate at $7 per base box, f.o.b. Pittsburgh, for delivery to July 1, prices on terne plate being given on page 1112.

**Wire Rods.**—The demand has quieted down a good deal, owing to slack operations among the wire mills, chain plants and other consumers. Export inquiry is also very quiet.

**Wire Products.**—Manufacturers have reduced prices on galvanized fence wire for shipment to Canada to $3.45 per 100 lb., which is the price to domestic consumers. The demand for plain and barbed wire is reported by the mills to be active; in fact, some mills state they are behind in shipments of barbed wire. The demand for wire nails is light, but prices are holding firm. However, there is some shading in prices on cement-coated nails in certain districts, notably Chicago, but this is not over about 10c. per keg. Prices on wire products are given on page 1112, but as noted above these are sometimes slightly shaded.

**Hot-Rolled Strip Steel.**—Consumers are still restricting new orders to small lots to cover actual needs, not being disposed to contract ahead, in view of the present uncertainty in prices. We quote hot-rolled strip steel at $3.30 per 100 lb.

**Cold-Rolled Strip Steel.**—The demand is almost entirely for small lots for prompt shipment to cover actual needs only, consumers not being disposed to buy ahead, as they believe that possibly present prices may not hold. Makers are operating only to about 50 per cent of capacity owing to light demand.

We quote cold-rolled strip steel at $5.65 base per 100 lb. f.o.b. Pittsburgh, for 1½-in. and wider, 0.100 in. and thicker hard tempered in coils 0.20 carbon and under. Boxing charge 25c. per 100 lb.

**Nuts and Bolts.**—It is said the present new demand for nuts and bolts is not any larger than it was prior to the heavy reduction in prices which became effective from March 28. Manufacturers were confident when the heavy reductions in prices were made that the trade would respond with heavy orders for delivery ahead, but this has not been the case. Makers of small rivets state that at the present discount of 65, 10 and 5 off list they cannot break even, and will have to secure lower prices on steel to allow them a profit. Discounts on nuts and bolts are given on page 1112.

**Cotton Ties.**—It will likely be some little time before the new price on cotton ties for this season is announced by the manufacturers. The Carnegie Steel Co. rolled ties through the winter and has stocks in its warehouses in the South ready to supply its trade when the season opens.

**Shafting and Screw Stock.**—Most of the demand is still coming from the automobile trade, general consumers placing only small orders for prompt delivery. It is said that discounts are being firmly held.

We quote cold-rolled shafting at 28 per cent off list to carloads and 21 per cent in less than carloads, f.o.b. Pittsburgh.

**Hoops and Bands.**—The demand for hoops and bands is very light, several plants in this district having been closed last week for lack of orders. We quote hoops and bands at 3.05c. f.o.b. Pittsburgh, plus usual extras.

**Spikes.**—The demand is still very quiet, being only for small lots to cover repair work under way by the railroads. The demand for boat and barge spikes is also dull and some spike makers are operating only to about 30 to 40 per cent of capacity.

We quote Standard spikes, 9/16 x 4½ in. and also small spikes $3.35 base per 100 lb. in carload lots of 200 kegs or more plus usual extras. Boat and barge spikes, $3.85 per 100 lb. in carload lots of 200 kegs or more.

**Iron and Steel Pipe.**—Mills are well filled on lap weld iron and steel pipe, but the demand for butt-weld pipe is very light. Mills report demand for oil country goods is heavy. It is said that discounts are firmly held by the mills, but in some cases are shaded by jobbers who desire to move out stocks. Discounts on iron and steel pipe are given on page 1112.

**Boiler Tubes.**—Makers report the demand for locomotive and merchant tubes is very quiet. Boiler and locomotive shops have very little new work on hand at present. Discounts are given on page 1112.

**Coke.**—The coke market is without change, the demand being very dull, and producers are still putting out ovens in an endeavor to bring output as close to consumption as they possibly can. It has been three or four years since the output of coke in the lower and upper Connellsville regions has been as small as it is at present. A fair amount of furnace coke loaded on cars is still being offered for prompt shipment, and this is selling at $3.50 to $3.75 per net ton at oven for standard grades. Blast furnaces that are taking coke this month on contracts are paying from $4.25 to $4.50 per ton for it. We now quote best grades of blast furnace coke at $3.50 to $4.00 for prompt shipment and $4.25 to $4.50 on contracts. Standard makes of 72-hr. foundry coke for prompt shipment are about $4 to $4.25, and on contract for delivery this month, prices range from $4.50 to $5 per net ton at oven. Output of coke in the upper and lower Connellsville regions for

the week ended April 12, was 150,415 net tons, a decrease from the previous week of 2200 tons.

Old Material.—Present conditions in the local scrap market are as quiet as they have been at any time this year, consumers holding off from buying until the price muddle at Washington is settled, and there is more anxiety on the part of dealers to sell, they believing that possibly prices may go still lower. After prices were suggested at Washington, effective from March 21, local conditions in the scrap trade picked up a good deal, the demand getting better, prices showing an advance of $1.00 to $1.50 a ton on nearly all grades. However, this gained ground in demand and prices have been lost, and the market has settled down to a waiting attitude on the part of both buyers and sellers. For several weeks, there was an active demand for borings and turnings from a leading consumer at West Brackenridge, Pa., and also from blast furnaces, but this demand has also stopped. We note sales in the past week of possibly 1000 tons of heavy steel scrap at $15, delivered, and a sale of 750 tons of turnings at about $10, delivered. Prices quoted by dealers at this writing to consumers for delivery to mills in the Pittsburgh district and other consuming points that take Pittsburgh freights are as follows:

| | |
|---|---|
| Heavy steel, melting, Steubenville, Follansbee, Brackenridge, Monessen, Midland and Pittsburgh, delivered | $15.00 |
| No. 1 cast, for steel plants | $18.00 to 19.00 |
| Rerolling rails, Newark and Cambridge, Ohio; Cumberland, Md.; Franklin, Pa., and Pittsburgh | 17.00 to 17.50 |
| Compressed steel | 13.00 to 13.50 |
| Bundled sheet, sides and ends, f.o.b. consumers' mills, Pittsburgh district | 11.50 to 12.00 |
| Bundled sheet stamping | 10.50 to 11.00 |
| No. 1 busheling | 14.00 to 14.50 |
| Railroad grate bars | 14.00 to 15.00 |
| Low phosphorus melting stock (bloom and billet ends, heavy plates) ¼ in. and heavier | 22.00 to 23.00 |
| Iron car axles | 29.00 to 30.00 |
| Locomotive axles, steel | 28.00 to 29.00 |
| Steel car axles | 25.00 to 26.00 |
| Railroad malleable | 15.00 to 15.50 |
| Machine shop turnings | 10.00 to 10.50 |
| Cast iron wheels | 20.00 to 21.00 |
| Rolled steel wheels | 17.00 to 18.00 |
| Sheet bar crop ends (at origin) | 18.00 to 18.50 |
| Heavy steel axle turnings | 12.00 to 13.00 |
| Heavy breakable cast | 18.00 to 19.00 |
| Cast iron borings | 10.50 to 11.00 |
| No. 1 railroad wrought | 19.00 to 19.50 |

## Some Improvement at Youngstown

YOUNGSTOWN, OHIO, April 22.—The Carnegie Steel Co. continues to register the best operating schedules in the district, averaging 90 per cent. Reports of other corporations indicate an improvement in operations this week. It is estimated by corporation executives that there are 10,000 men idle in the Mahoning Valley. The Bessemer plant of the Republic Iron & Steel Co. resumed Sunday after a brief shut-down. The Brown-Bonnell finishing department is operating in full with the exception of four mills. The open-hearth works is on a 60 per cent schedule.

The Youngstown Sheet & Tube Co. is operating about 60 per cent; eight of 14 sheet mills are in commission; the puddle mill is idle. The Brier Hill Steel Co. is running about 65 per cent at its three works. The plate mill of the Sharon Steel Hoop Co. is idle and hot mills are operating intermittently.

Blast furnace No. 4 of the Carnegie Steel Co., at Sharon, Pa., has been blown out for relining.

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The importance of the merchant marine in the development of foreign trade, and facts that the exporter should know concerning the technique of shipping by ocean carrier are set forth in an illustrated booklet issued by the Guaranty Trust Co., New York, under the title, "Shipping's Share in Foreign Trade—Fundamentals of Ocean Transportation."

The A. M. Byers Co., Pittsburgh, is getting estimates on a two-story brick and stone office building for the Girard, Ohio, works. It will cost about $75,000.

# British Iron and Steel Market

## Advance in Prices Likely—Effects of the Eight-Hour Law—Fuel Shortage Not so Serious

LONDON, ENGLAND, March 31.—The general position continues far from satisfactory, and the looked-for boom in trade has not yet materialized. This is explained chiefly by the lack of confidence brought about by the uncertainty regarding labor, the shortage of some raw materials, and the doubtful position as to the future prices. Unfortunately it appears as if these are much more likely to go up than down, as the pig-iron subsidy comes off at the end of April and it looks as if a substantial advance must be forthcoming from the consumers to replace the payments which have been made by the government. The state of the iron trade is peculiar, the great complaint being that deliveries cannot be got from the works, and orders in all directions are being refused, due almost solely to the 8-hr. system which has cut down production severely. One effect of the scarcity of iron is a reversion to steel, which can be had more easily, and, for example, nuts and bolts are being made of steel.

The Ministry of Munitions, it is understood, is making arrangements for shell, shell forgings and for war material remaining over from cancellation of contracts in United States and Canada to be shipped to British ports and placed at the disposal of steel manufacturers as rerolling material or else as scrap, in cases where such material could only be disposed of in America or Canada at unusually low prices. Meanwhile a satisfactory feature is that the steel works in the west of Scotland are well employed, and specifications for plates are plentiful.

The addition to the cost of steel as a result of the shorter hours is very considerable. Scotch malleable iron makers have received sanction to advance the price of bar iron 30s. per ton for home business. This advance brings cost prices to the level of those quoted in English districts and makes Crown bars £17 15s. per ton net on trucks at the works. The export price is unchanged. The home business is of sufficient volume to keep the malleable iron works running fully, although there is less pressure for delivery.

The Birmingham Corporation was recently in the market for 1000 tons of steel girder rails, for which it appears only three tenders were received, two English and one American, and it is now reported that the order has gone to the Lorain Steel Co. of Cleveland, Ohio, at a cost of £16 15s. per ton. Owing to the urgency of the work it was necessary to decide between the three tenders and that of the Lorain company was considered most favorable both as to price and delivery, the latter being a matter of supreme importance. The American firm has undertaken to deliver the rails by the end of April.

Although the outlook in regard to the coal industry is rather better, there has been already a considerable shortage of fuel in some districts. Owing to the scarcity of coal the large Clarence Steel Works of Dorman Long & Co. have had to close down. The Cargo Fleet Iron Co. is also idle.

It appears likely, also, that the government will be urged to waste no time in organizing the proposed Ministry of Commerce. Meanwhile the industrial situation is exceedingly grave, and part of the trouble is the inevitable consequence of the government's paying 29s. a week to men and 25s. to women who prefer idleness to work. The result is that with unlimited orders in sight the ranks of unemployment are swelling steadily and there is not the least doubt that a catastrophe is within reasonable distance. All over the country people are throwing up their jobs to draw Lloyd George's allowance and employers are in despair. One steel mill manager whose responsibilities cover 8000 men, stated a few days ago that very few of the hands now did more than two days' work a week. They chucked up when they had done this, and drew the government allowance for the rest of the week, claiming broken time. The people openly say that there is no reason why they should work for money when they can get it by doing nothing.

## Chicago

CHICAGO, April 22 (*By Wire*)

In some quarters a more cheerful spirit than a week ago is being manifested. This feeling is based on the belief that many consumers no longer hope for further price reduction, a view which is suggested, if not confirmed, by an increase in inquiry and a slight expansion in the volume of orders for some products. Purchases of wire products continue relatively extensive on account of the pressing needs of the season. There is some activity in shapes as the result of building projects which are being undertaken for completion this year. It is reported that 10,000 tons of steel required for the construction of Butler Brothers' building will go to an independent mill. In general, however, the orders being booked are small and practically all for current needs which cannot wait price changes. If there is any shading of prices to secure business, it is being done very quietly.

The leading independent is operating at about 65 per cent of capacity against 45 last week, but this improvement is the result of an accumulation rather than appreciable increase in the volume of orders. The leading interest, which was operating on a 74 per cent basis a week ago, is now down to 70 per cent.

Some producers of pig iron report an increase in orders and inquiries, but these have been for small lots. Scrap shows weakness, and numerous items are lower. The leading interest has purchased several thousand tons of melting steel at $16.

**Pig Iron.**—The pessimism which prevailed last week as a result of the slowing down of business following the price controversy shows signs of breaking. In fact, some producers report that orders for small quantities are increasing in number and inquiries are encouraging. Although business is still at a low ebb, some dealers believe consumers are becoming convinced that lower prices cannot be expected, no matter what course the controversy between Messrs. Peek and Hines takes. The situation among melters is spotty, some serving the automobile, tractor and agricultural implement industries being in need of iron, while jobbing foundries are doing little. Producers declare that they are not offering any price concessions and that resale lots offered below quotations are of no consequence. Although the shipping board has announced a reduction in lake freight rates on ore, from $1 a ton to 30c., this reduction is not expected to be an important factor in the price of iron prices.

The following quotations are for iron delivered at consumers' yards, except those for Northern foundry, malleable and steel-making irons, including low phosphorus, which are f.o.b. furnace, and do not include a switching charge averaging 50c. per ton:

| | |
|---|---|
| Lake Superior charcoal, average silicon 1.50, second half delivery, f.o.b. furnace, average freight to Chicago $2.50 (other grades subject to usual differentials) | $29.25 |
| Lake Superior charcoal, first half, nominal | 38.85 |
| Northern coke foundry, No. 1 silicon, 2.25 to 2.75 | 28.00 |
| Northern coke foundry, No. 2 silicon, 1.75 to 2.25 | 26.75 |
| Northern high-phosphorus foundry | 26.75 |
| Southern coke, No. 1 foundry and No. 1 soft silicon, 2.75 to 3.25 | 34.75 |
| Southern coke, No. 2 foundry, silicon, 2.25 to 2.75 | 33.00 |
| Southern foundry, silicon, 1.75 to 2.25 | 31.75 |
| Malleable, not over 2.25 silicon | 27.25 |
| Standard Bessemer | 27.95 |
| Basic | 25.75 |
| Low phosphorus (copper free) | 48.25 |
| Silvery, 7 per cent | $41.15 to 41.55 |

**Ferroalloys.**—Producers are still holding to prices, but resale lots continue to be offered at low figures. Resale spiegeleisen can be had for $35 per ton, delivered, resale quantities of ferromanganese and ferrosilicon are available at $125 and $100 per ton delivered respectively. The supply of resale ferromanganese is showing signs of becoming exhausted. There has been little activity in any of the ferroalloys.

We quote 80 per cent ferromanganese, resale, at $125 delivered; 50 per cent ferrosilicon, resale, at $100, delivered, and 16 to 18 per cent spiegeleisen at $35 to $40, furnace.

**Plates.**—There has been little improvement in the demand for plates. One local mill, which has been running intermittently, is operating full this week but has few orders ahead.

The mill quotation is 2.65c., Pittsburgh, the freight to Chicago being 27c. per 100 lb. Jobbers quote 3.67c. for plates out of stock.

**Structural Material.**—Structural business is somewhat better, but by no means normal. Some structural rolling equipment which has been idle for several weeks is again in operation. The building which will be undertaken this year is being reflected in a number of inquiries and orders. The Morava Construction Co., Chicago, is reported to have awarded the contract for the fabrication of 10,000 tons for the building being erected for Butler Brothers. This steel, it is said, will be rolled by the leading independent mill. The Morava Construction Co. will also fabricate 316 tons for a building to be constructed by the Waterman Fountain Pen Co., Chicago. Wendnagel & Co., Chicago, have contracts for 227 tons to be used in the Nash School, Chicago, and 225 tons for a theatre at South Chicago. The Haynes Automobile Co. has taken bids on 883 tons for work at Kokomo, Ind. The Ventura Implement Co. is inquiring for 300 tons for a factory building at Ventura, Cal., and C. E. Atkinson, general contractor, Webster City, Iowa., is in the market for 200 tons for an addition to the Wahkonsa Hotel, Fort Dodge, Iowa. Bids are to be taken on 233 tons for the Oregon and Jackson Street Bridge, Oshkosh, Wis.

The mill quotation is 2.45c., Pittsburgh, which takes a freight rate of 27c. per 100 lb. for Chicago delivery. Jobbers quote 3.47c. for material out of warehouse.

**Bars.**—Bar iron and rail carbon mills are still operating on a hand to mouth basis. One maker of steel bars reports a fair demand for that product, but in general, producers say the outlook is not encouraging.

Mill prices are: Mild steel bars, 2.35c., Pittsburgh, taking a freight rate of 27c. per 100 lb.; common bar iron, 2.50 to 2.60c., Chicago; rail carbon, 2.45c., mill. Jobbers quote 3.37c for steel bars out of warehouse.

**Sheets.**—There is but little change in the situation, except that a slight betterment in production is noted.

Jobbers quote Chicago delivery out of stock: No. 10 blue annealed, 4.57c.; No. 28 black, 5.37c., and No. 28 galvanized, 6.72c.

Mill quotations are 4.35c. for No. 28 black; 3.55c. for No. 10 blue annealed, and 5.70c. for No. 28 galvanized.

**Wire Products.**—Jobbers continue to buy in small lots, but are afraid to accumulate stocks. The duplication of orders calling for prompt delivery, however, indicates that what they do buy is moving rapidly to consumers. The growing volume of building work is making itself felt at the mill. Business in general is fair, but the volume is not as large as would ordinarily be expected at this season.

**Rails and Track Supplies.**—There has been a little demand for track fastenings, but real activity cannot be expected until the railroad situation is relieved.

Standard railroad spikes, 3.35c., Pittsburgh. Track bolts with square nuts, 4.35c., Pittsburgh. Steel tie plates and angle bars, 2.75c., Pittsburgh and Chicago; tie plates, iron, 2.75c., f.o.b. makers' mills. Light rails, 2.45c., f.o.b. makers' mills, with usual extras.

**Bolts and Nuts.**—Business again shows an upturn possibly because of pressing needs which cannot await the outcome of the price situation. While orders are being received in fair volume, they are by no means as heavy as was hoped for before the controversy regarding the Industrial Board's suggested price reductions were started.

Structural rivets, 4.77c.; boiler rivets, 4.72c.; machine bolts up to ¾ x 4 in., 50 per cent off; larger sizes, 40 off; carriage bolts up to ¾ x 6 in., 40 and 10 off; larger sizes 35 off; hot pressed nuts, square tapped, $1.73 off; hexagon tapped, $1.73 off; coach or lag screw, gimlet points, square heads, 50 and 10 per cent off. Quantity extras for nuts are canceled.

**Old Material.**—Weakness has developed in the past week as a result of a falling off in demand. Rolling mill and steel foundry grades are dead. The leading interest which offered $16 for heavy melting steel for some time, has purchased several thousand tons at that figure. It is commonly reported that brokers and dealers in scrap are keenly disappointed in the failure of price negotiations to inaugurate activity on the part of the steel mills. It was in expectancy of such activ-

ity that they indulged in considerable speculative buying recently and themselves paid more for old material than would consumers. Railroad offerings have fallen off sharply.

We quote delivery in buyers' yards, Chicago and vicinity, all freight and transfer charges paid, as follows:

| | |
|---|---|
| Iron rails | $22.00 to $23.00 |
| Relaying rails | 35.00 to 45.00 |
| Carwheels | 21.00 to 22.00 |
| Steel rails, rerolling | 17.50 to 18.00 |
| Steel rails, less than 3 ft. | 17.50 to 18.00 |
| Heavy melting steel | 15.75 to 16.25 |
| Frogs, switches and guards cut apart | 15.75 to 16.25 |
| Shoveling steel | 15.50 to 16.00 |
| *Per Net Ton* | |
| Iron angles and splice bars | $19.00 to $20.00 |
| Steel angle bars | 15.00 to 15.50 |
| Iron arch bars and transoms | 22.50 to 23.50 |
| Iron car axles | 28.00 to 29.00 |
| Steel car axles | 23.50 to 24.50 |
| No. 1 busheling | 13.50 to 14.00 |
| No. 2 busheling | 9.00 to 9.50 |
| Cut forge | 14.00 to 14.50 |
| Pipes and flues | 12.50 to 13.00 |
| No. 1 railroad wrought | 15.50 to 16.00 |
| No. 2 railroad wrought | 14.00 to 14.50 |
| Steel knuckles and couplers | 17.00 to 17.50 |
| Coil springs | 18.50 to 19.00 |
| No. 1 cast | 20.00 to 21.00 |
| Boiler punchings | 18.00 to 19.00 |
| Locomotive tires, smooth | 17.50 to 18.00 |
| Machine shop turnings | 5.50 to 6.50 |
| Cast borings | 9.25 to 9.75 |
| Stove plate and light cast | 16.00 to 16.50 |
| Grate bars | 15.75 to 16.25 |
| Brake shoes | 14.50 to 15.00 |
| Railroad malleable | 15.00 to 16.00 |
| Agricultural malleable | 15.00 to 15.50 |
| Country mixed | 11.00 to 12.00 |

Cast-Iron Pipe.—Kalamazoo, Mich., will take bids on 250 tons on April 26. Mitchell, S. D., has awarded 225 tons to the Hammond-Byrd Iron Co. Fond Du Lac, Wis., will receive bids on 130 tons on April 25.

We quote per net ton, f.o.b. Chicago, ex-war tax, as follows: Water pipe, 4-in., $59.80; 6-in. and larger, $56.80; class A and gas pipe, $1 extra.

## Philadelphia

PHILADELPHIA, April 22.

Last week was one of the quietest ever known in the local steel and pig iron market, and no improvement in demand is looked for until the Washington price controversy has been settled one way or another. Results from President Wilson's cablegram instructing the Industrial Board of the Department of Commerce and the Railroad Administration to resume negotiations on rail prices will be watched with interest, but there is a feeling that the psychological effect which was expected from the price stabilization plan has been destroyed even though Director General Hines should now agree to make purchases at the prices named. Unless the disagreement is quickly settled, there will undoubtedly be an open market for steel products, and a prediction is that domestic prices of rails will be advanced $10 a ton, or $55 and $57, which are the new prices for export business.

The steel and pig iron trade now has its attention focused on the signing of the peace treaty, believing that the conclusion of peace will be the starting point for the long-expected business revival. Export trade is at present as sluggish as domestic business.

Director General Hines is reported as stating in an address in Chicago that orders covering current requirements of the railroads will be placed regardless of the price controversy, but this is not borne out by the action of the Bureau of Inland Waterways, Railroad Administration, which has delayed placing orders for 6000 tons of plates, shapes and bars for canal barges, bids for which were recently submitted by the mills. Nor has the Navy Department placed orders for about 20,000 tons of plates, shapes and bars for new battleships, though the bids closed on April 4. At the office of the Bureau of Supplies and Accounts, Navy Department, it has been stated that these orders are being held up "awaiting readjustment in prices."

Despite the lack of business, prices on steel products and pig iron are being well maintained and reports of cutting are often proved to be erroneous. Some of the larger steel companies have notified their sales agents to make no price concessions of any kind. As for the smaller companies, their higher cost of production is an obstacle to lower selling prices.

Operations at Eastern steel plants vary from 40 to 50 per cent of capacity, many mills being forced into idleness because of lack of orders. Plate mills are particularly hard hit.

**Pig Iron.**—Virtually nothing is being done in the pig iron market. On some of the inquiries which have recently been in the market, action has been postponed by the prospective purchasers. The market is regarded by sellers as open. In the absence of sales, the prices quoted below may be regarded as nominal, as there seems no doubt that sellers would quote on a lower basis if attractive business were offered. An Eastern furnace company has granted its customers a reduction of $4.25 on contracts, but these contracts are understood to have named no price at time of sale, merely stating that the iron would be billed at the "Government price at time of shipment." Other Eastern furnaces are resolutely opposing revision of contracts to the new price basis. Inquiries for large tonnages of steel-making iron for export continue to come into the market, but a majority of them are not regarded seriously. We quote standard grades of iron delivered in Philadelphia or vicinity except low phosphorus iron, which is quoted f.o.b., furnace:

| | |
|---|---|
| Eastern Penna. No. 2 X (2.25 to 2.75 sil.) | $31.90 |
| Eastern Penna. No. 2 plain (1.75 to 2.25 sil.) | 30.65 |
| Virginia No. 2 X (2.25 to 2.75 sil.) | 31.60 |
| Virginia No. 2 plain (1.75 to 2.25 sil.) | 30.60 |
| Basic | 29.65 |
| Gray forge | 29.65 |
| Standard low phosphorus (f.o.b. furnace) | 46.75 |
| Copper-bearing low phosphorus (f.o.b. furnace) | 43.75 |

**Ore.**—In the week ended Saturday, April 19, ore imports at this port were 3970 tons of manganese ore from Brazil, valued at $163,754, and 100 tons of chromic ore, also from Brazil, valued at $51,671.

**Ferroalloys.**—The leading producer of ferromanganese has had for some weeks only one of its four furnaces in blast, and this is a measure of the demand for that alloy. In fact, very little new business is offered and shipments are practically all on old contracts. Producers are still asking $150 for 78 to 82 per cent, delivered, but resale material is available at $115 to $125. Spiegeleisen analyzing 18 per cent and over has been sold at $34.90, this being resale material.

**Plates.**—Bids were received up to 10 a.m. to-day (Tuesday) by the Navy Department, Washington, on about 25,000 tons of special treatment and nickel steel protective deck plates for new battleships Nos. 49, 50, 51 and 52. These plates are to be ¼-in. to 3½-in. thick and up to 150 in. wide. Only those companies now equipped to make armor plate are expected to bid. The total cost will be several millions of dollars. Orders for rolled plates are few and in small tonnage. Eastern plate mills are being operated only intermittently owing to lack of business. On 240 tons of plates for the American Expeditionary Forces, the War Department insisted on f.o.b. mill quotations instead of on a Pittsburgh base, a new departure which Eastern makers believe will work against them on Government business. In this case the order went to a Youngstown mill which quoted 2.65c. mill. We quote sheared plates, ¼-in. and heavier, 2.895c., Philadelphia.

**Structural Material.**—Numerous new building projects are talked of, including hotels, theaters, office buildings and apartments in Philadelphia and a large hotel at Atlantic City, but no definite progress is being made so far as the steel trade learns. An extension of the Frankford elevated requiring about 1500 tons is the only important project in Philadelphia on which bids are being gotten. We quote plain material at 2.695c., Philadelphia.

**Spikes.**—Eastern makers have reduced their quotation on boat spikes from 4.50c. to 3.85c., Pittsburgh, to meet prices which have been quoted by Pittsburgh makers for the past few weeks. In one case the 3.85c. price has been shaded to 3.80c. to secure desirable business.

**Rolled Steel Wheels.**—In line with reductions on all other steel products, prices on rolled steel wheels have been reduced approximately $2 per wheel.

**Bars.**—There has been no settlement of the strikes of puddlers at two Eastern bar iron rolling mills and these mills are shut up tight. Very little bar iron business is being placed. Orders for steel bars are in fair volume and at some mills the bar department is busier than any other. Special bar steel for manufacturing purposes seems to be in fairly good demand as compared with other steel products. We quote bar iron at 2.595c. and double refined at 3.595c., and soft steel bars at 2.595c., Philadelphia.

**Sheets.**—About the only orders coming to the mills for sheets are for small lots, mostly less than carloads. We quote sheets for delivery in the Philadelphia district as follows: No. 10 blue annealed, 3.795c.; No. 28 black, 4.595c., and No. 28 galvanized, 5.945c.

**Old Material.**—In the absence of buying by the mills, the scrap market shows further weakness, No. 1 heavy melting steel being quoted at $15 to $15.50, delivered; No. 1 railroad wrought at $21 to $22; short shoveling turnings for blast furnaces, $10.50 to $11.50; machine shop turnings for rolling mill use, $11.50 to $12.50, and clean cast borings, $13 to $14, all of these being declines from a week ago. The market is simply waiting and some producers and dealers are unwilling to sell at the prices which would now be obtainable An Eastern steel plant which will pay $14.50, delivered, for No. 1 heavy melting steel is said to have had no offerings at that price. We quote for delivery at consumers' works in eastern Pennsylvania as follows:

| | |
|---|---|
| No. 1 heavy melting steel | $15.00 to $15.50 |
| Steel rails, rerolling | 17.50 to 18.00 |
| No. 1 low phosphorus, heavy, 0.04 and under | 22.50 to 23.00 |
| Iron rails | 20.00 to 22.00 |
| Carwheels | 23.00 to 24.00 |
| No. 1 railroad wrought | 21.00 to 22.00 |
| No. 1 yard wrought | 20.00 to 21.00 |
| Country yard wrought | 12.00 to 15.00 |
| No. 1 forge fire | 12.00 to 13.00 |
| Bundled skeleton | 12.00 to 13.00 |
| No. 1 busheling | 15.00 to 16.00 |
| No. 2 busheling | 13.00 to 14.00 |
| Turnings (short shoveling grade for blast furnace use) | 10.50 to 11.50 |
| Mixed borings and turnings (for blast furnace use) | 9.50 to 10.50 |
| Machine-shop turnings (for rolling mill use) | 11.50 to 12.50 |
| Cast borings (clean) | 13.00 to 14.00 |
| No. 1 cast | 22.00 to 23.00 |
| Grate bars | 17.00 to 18.00 |
| Stove plate | 17.00 to 18.00 |
| Railroad malleable | 18.00 to 19.00 |
| Wrought iron and soft steel pipes and tubes (new specifications) | 18.50 to 19.00 |
| Ungraded pipe | 13.00 to 14.00 |

## Birmingham

BIRMINGHAM, ALA., April 21.

**Pig Iron.**—Scattering sales from carloads to as much as 300-ton lots, the total a small one, constitute the week's business of the Birmingham district operators. Every order was for prompt delivery. Quotation was made on a lot of 10,000 tons for England, but there is no indication that it will be placed. The same might be said of an effort to place iron for Mediterranean and other European delivery. Ocean rates are still too high. Even with the small business going, there have been well-founded reports of actual sales made under the market price either directly or indirectly. One of these was a sale by fracture instead of analysis, which entailed a sacrifice of the silicon differential. In another quarter brokers are reported to have undersold on iron held by them and still again it is reported that there has been delivery of iron a grade higher than that specified in the order. As a rule, however, the iron makers are adhering to the recent schedule, there being no reason for any other course with the little business that is going. One large iron maker, recently making a survey of its foundry customers' status, reports reduced operations and stocks on hand that would last, under present operating capacity, well through the third quarter, and in some instances through the remainder of the year. We quote per gross ton, f.o.b. Birmingham District furnaces, as follows:

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|---|---|
| Foundry, 1.75 to 2.25 silicon | $26.75 |
| Basic | 25.75 |

**Cast-Iron Pipe.**—Pipe is gradually taking on more activity. Southern municipalities, which have been out of the market for four years, have been forced in and are placing orders for immediately necessary requirements. New by-product works will take something like 1000 tons. Sanitary shops are doing better than in some time.

**Coke.**—In response to the attacks of Virginia coke offering here, Birmingham operators have reduced the price of 72-hr. hand-picked to $8 per ton. Trading is confined to small prompt orders.

**Old Material.**—The scrap market has reconciled itself to present minimum prices for some time to come. No substantial recovery is expected before October. There is a substantial movement in cast iron, but steel scrap is still very slow and wrought slower.

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|---|---|
| Steel rails | $10.50 to $11.00 |
| No. 1 heavy steel | 11.00 to 12.00 |
| Cast iron borings | 6.00 to 6.50 |
| Machine shop turnings | 6.00 to 6.50 |
| Stove plate | 13.00 to 13.50 |
| No. 1 cast | 19.00 to 19.50 |
| Car wheels | 19.00 to 19.50 |
| Tramcar wheels | 18.00 to 18.50 |
| Steel axles | 17.00 to 18.00 |
| No. 1 wrought | 12.00 to 13.00 |

## Buffalo

BUFFALO, April 21.

**Pig Iron.**—The market remains in a quiescent state. Inquiry and orders still remain at a low ebb. Furnacemen are imbued with a strong belief that business will remain in check until the stabilization of prices has been reached, and when that state has crystallized, buying in more normal volume will be resumed. There appears to be considerable pent-up inquiry held in leash awaiting the clearing of the price situation. One of the furnaces of the Wickwire Steel Co. went out of blast April 10, making a total of three not in blast out of the 11 merchant furnaces of the district. As regards revising old contracts to the recently suggested basis of prices there is nothing new in so far as Buffalo furnace interests are concerned, and it looks now as though none of the Buffalo pig iron producers will make any price revision on such contracts. We continue the price schedule current for the last three weeks, as follows:

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|---|---|
| No. 1 foundry, 2.75 to 3.25 silicon | $29.75 |
| No. 2 X, 2.25 to 2.75 silicon | 28.00 |
| No. 2 plain foundry, 1.75 to 2.25 silicon | 26.75 |
| Gray forge | 25.75 |
| Malleable, silicon not over 2.25 | 27.25 |
| Basic | 25.75 |
| Basic, 1 to 1½ per cent manganese | 26.25 |
| Basic, 1½ to 2½ per cent manganese | 26.75 |
| Bessemer | 27.95 |

**Finished Iron and Steel.**—Business is maintaining a very quiet attitude in all lines with the exception of wire and wire products, in which it is continuing at a fairly good rate. In bars, plates and shapes mill agencies report unusual pressure for delivery on the scant orders placed by consumers. Telegrams generally follow orders closely, urging quick shipment with tracer, by wire, indicating that buyers have delayed placing orders until material is actually needed, then bringing every pressure to bear to have them completed with a rush. Mills are having considerable difficulty in keeping promises due to the small amount of tonnage that is finding its way to order books and consequent paucity of some sizes in making up rolling schedules. There are unconfirmed reports of open market conditions in the Canadian field.

Steel bars, 3.45c.; iron bars, 4.15c.; shapes, 3.55c.; plates 3.75c.; No. 10 blue annealed sheets, 4.65c.; No. 28 black, 5.70c.; No. 28 galvanized sheets, 7.05c.

**Old Material.**—There has been some let-up in the buying for the week. Although not sufficiently marked to amount to a set-back, the spurt in purchasing that started with the announcement of the new scale of prices for finished materials the week of March 21 has simply stopped for the time being, but the market is as strong sentimentally as it has been recently and the demand for borings, heavy melting steel and malleable has been good. Such purchases as have been consummated this week, however, originated at outside points. No local buying is in evidence. Dealers here appear to be disinclined to go out of the district points, preferring to hold for the local market, confidently believing they will obtain much higher than present prices when buying starts again. There has been a fair amount of speculative buying going on between dealers. Out of the railroad lists offered during the last two or three months dealers have gotten very little scrap, most of it being sold direct to mills. It is stated the Federal Government is about to sell some ingots, billets and forgings, which were unloaded some months ago and stored by the Government at several plants in this vicinity, representing an approximate total of 33,000 tons. Prices remain unchanged and largely nominal. We quote the schedule the same as last week, as follows:

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|---|---|
| Heavy melting steel, regular grades | $14.50 to $15.50 |
| Low phosphorus, 0.04 and under | 21.00 to 22.00 |
| No. 1 railroad wrought | 19.00 to 19.50 |
| No. 1 machinery cast | 21.00 to 22.00 |
| Iron axles | 23.00 to 24.00 |
| Steel axles | 23.00 to 24.00 |
| Carwheels | 21.00 to 22.00 |
| Railroad malleable | 17.00 to 18.00 |
| Machine shop turnings | 8.50 to 9.50 |
| Heavy axle turnings | 13.00 to 14.00 |
| Clean cast borings | 11.00 to 12.00 |
| Iron rails | 21.00 to 22.00 |
| Locomotive grate bars | 16.00 to 17.00 |
| Stove plate | 18.50 to 19.00 |
| Wrought pipe | 13.00 to 14.00 |
| No. 1 busheling | 13.00 to 14.00 |
| Bundled sheet stamping | 11.00 to 12.00 |

## New York

NEW YORK, April 22.

**Pig Iron.**—One firm sold about 1000 tons of foundry pig iron during the past week, nearly equally divided between domestic and foreign business, the tonnage for export going to South America. Other firms booked orders of smaller tonnage and the market in general continues dull. There is much uncertainty in regard to prices and every transaction seems to be a law unto itself. In some cases concessions are made in not adhering to the usual differentials. Many foundries are complaining that the Government is very slow in making payments on contracts and rather severe financial stringency in some quarters is attributed to this cause. While a few foundries are very busy, many are working at less than half of their capacity. Reports from New Jersey indicate business in that State is very slack among the foundrymen. We quote as follows delivered New York, for Northern and Southern grades:

| | |
|---|---|
| No. 1 foundry, silicon, 2.75 to 3.25 | $31.55 |
| No. 2 X, silicon, 2.25 to 2.75 | 29.80 |
| No. 2 plain, silicon, 1.75 to 2.25 | 28.55 |
| No. 2 X, Virginia, silicon, 2.25 to 2.75 | $31.90 to 32.40 |
| No. 1 Southern, silicon, 2.75 to 3.25 | 37.45 |
| No. 2 Southern, soft (all rail), sil. 2.25 to 2.75 | 35.70 |
| No. 2 Southern (all rail), sil., 1.75 to 2.25 | 34.45 |

**Ferroalloys.**—There is a continued absence of demand even for small quantities for either ferromanganese or spiegeleisen and quotations are nominal at $150, delivered, for 80 per cent ferromanganese, with $2 per unit deducted for material under 78 per cent and at $40, delivered, for spiegeleisen. It is understood that most of the British alloy, due to be imported in this country on pre-war contracts, has been received and delivered. There have been no reports of any further sales of resale ferromanganese and it is believed that nearly all of this has been absorbed. It is stated that a Middle Western consumer recently bought 100 tons of resale spiegeleisen at $32, delivered. The Indian manganese ore, reported last week as available at 55c. per unit at seaboard, has not yet been sold. Ferrosilicon, 50 per cent, is obtainable at $90 per ton for early or future delivery with the electrolytic 15 per cent alloy, low in phosphorus, obtainable at $55 delivered.

**Finished Iron and Steel.**—Sellers report uniformly a rate of mill operations lower than most of them ever recall. Business is exceedingly dull, including export trade. Quite an additional number of structural steel jobs have been figured on but the signing of the contracts is delayed. Prices are nominal, but firm in the face of some shopping, with the buyer offering without success to place business at a slight concession. About the only item of this kind in which a cut was made covers about 150 tons of steel bars sold at 2.30c., Pittsburgh, basis. An inquiry for several thousand tons of light rails for shipment to the Far East is under negotiation. New structural projects which may be added to those listed in late issues include 400 tons for the Addyston plant of the United States Cast Iron Pipe & Foundry Co.; 500 tons for the Coney Island terminal for the New York Municipal Railways; 1100 tons for a fertilizer storehouse for Armour & Co., at Chicago; 250 tons for a highway bridge at Lockhart, S. C.; 4000 tons for Government storehouses at Hampton, Va.; 1500 tons for a bridge for the Boston & Maine over the Connecticut River; 1000 tons for a bridge for New York State at Rondout and 300 tons for a trestle at Hazzard, Pa., for the New Jersey Zinc Co. The Pennsylvania Railroad has awarded contracts for 300 tons of bridge work. We quote mill shipments as follows: Bar iron, refined grade, 2.62c.; double refined bar iron, 3.62c.; soft steel bars, 2.62c ; shapes, 2.72c.; plates, 2.92c., all New York.

**Warehouse Business.**—In all lines, taken as a whole, jobbing is practically at a standstill, although additional activity of slight proportions is reported for the time-being in steel for construction work. With the heavy stocks now in store, and some shipments still due on orders placed at the recent agreed price scale, dealers have cut their buying from the mills down to a minimum. In the sheet trade the accumulation of goods, resulting from the failure of low prices to bring out sufficient orders, has served to eliminate virtually the recently current range of 20c. (per 100 lb.) on black and galvanized, quotations now holding at the low point, for No. 28 black soft steel sheet 5.50c., and for No. 28 galvanized sheet 6.50c. An offering of galvanized for 6.20c. by one dealer is reported. On galvanized sheets at the recent Washington base, 5.70c. at mill, 6.50c. covers the mill price plus 27c. freight, plus about $10 a ton which some jobbers estimate as entirely taken up by the cost of warehousing. On sheets shipped by the mills at higher invoices, losses, in some cases quite large, are reported to have resulted. This situation is paralleled as regards black sheets. With cost of carting varying from 18c. to 35c. in Brooklyn, 25c. from lower Manhattan uptown and 40c. to the Bronx, dealers are reported taking in some cases a considerable loss to keep stocks down. Other out-of-store prices are: Steel bars, 3.37c.; structural shapes, 3.47c.; plates, 3.67c.; bands, 3/16 in., Nos. 10 and 12, 4.07c.; shafting, net list.

**Cast-Iron Pipe.**—The usual spring business is not developing. Municipalities are refusing to come into the market and orders from private buyers are limited to absolute necessity. There is much complaint in regard to prices being too high. New York quotations are as follows: 6-in. and heavier, $57.70; 4-in., $60.70; 3-in., $67.70, and $1 additional for class A and gas pipe.

**Old Material.**—The slowness in settling the steel price controversy is reflected in the scrap market, causing a general state of pessimism. Prices took a slight revision downward in several items, though the absence of sales makes it difficult to establish exact figures. Those having clean cast borings or machine shop turnings are glad to sell them at the lower price which mixed borings and turnings bring for blast furnace use, since there is very little demand for the unmixed grades

from rolling mills. Prices which brokers are quoting dealers, New York, follow:

| | |
|---|---|
| Heavy melting steel | $11.50 to $12.00 |
| Rerolling rails | 14.00 to 14.50 |
| Relaying rails, nominal | 38.00 to 40.00 |
| Steel car axles | 19.00 to 20.00 |
| Iron car axles | 24.00 to 25.00 |
| No. 1 railroad wrought | 18.50 to 19.50 |
| Wrought iron track | 13.00 to 14.00 |
| Forge fire | 8.00 to 9.00 |
| No. 1 yard wrought, long | 15.00 to 15.50 |
| Light iron | 5.00 to 5.50 |
| Cast borings (clean) | 9.50 to 10.00 |
| Machine shop turnings | 8.00 to 8.50 |
| Mixed borings and turnings | 7.50 to 8.00 |
| Iron and steel pipe (1 in. minimum diameter), not under 2 ft. long | 13.50 to 14.00 |
| Stove plate | 16.00 to 17.00 |
| Locomotive grate bars | 15.00 to 15.50 |
| Malleable cast (railroad) | 13.50 to 14.00 |
| Old carwheels | 20.50 to 21.00 |

Prices which dealers in New York and Brooklyn are quoting to local foundries, per gross ton, are:

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|---|---|
| No. 1 machinery cast | $22.00 to $23.00 |
| No. 1 heavy cast (columns, building materials, etc.), cupola size | 22.00 to 23.00 |
| No. 1 heavy cast, not cupola size | 15.00 to 16.00 |
| No. 2 cast (radiators, cast boilers, etc.) | 16.50 to 17.50 |

## St. Louis

ST. LOUIS, April 21.

**Pig Iron.**—There is still no disposition to make contracts ahead for pig iron, and in consequence the only buying that is being done is on small quantities for immediate needs or special purposes, and very little of that. An inquiry in the market for 750 tons was cut to 200 tons on closing the actual purchase and the inclination of the trade generally is to await developments so long as individual conditions permit, and thus avoid commitments pending adjustment of the uncertainties created by the attitude of the Railroad Administration regarding steel products. At the same time, general business in this area is proceeding at such a pace that improved conditions are expected shortly through sheer pressure of domestic demand.

**Old Material.**—The scrap dealers are doing practically no business, the gambling element being inclined neither to buy nor to sell, with the result that the only transactions that are taking place are those of actual immediate needs. No new lists are coming out of consequence and neither rolling nor steel mills nor foundries are making any new purchases, while they are also inspecting receipts on contracts very severely.

| *Per Gross Ton* | |
|---|---|
| Old iron rails | $22.00 to $23.00 |
| Old steel rails, rerolling | 17.25 to 17.75 |
| Old steel rails, less than 3 ft. | 16.50 to 17.00 |
| Relaying rails, standard sections subject to inspection | 40.00 to 45.00 |
| Old carwheels | 22.00 to 22.50 |
| No. 1 railroad heavy melting steel | 15.00 to 15.50 |
| Heavy shoveling steel | 14.00 to 14.50 |
| Ordinary shoveling steel | 13.00 to 13.50 |
| Frogs, switches and guards, cut apart | 15.50 to 16.00 |
| Ordinary bundled sheets, scrap | 9.00 to 9.50 |
| Heavy axle and tire turnings | 9.00 to 9.50 |
| *Per Net Ton* | |
| Iron angle bars | $16.00 to $16.50 |
| Steel angle bars | 14.50 to 15.00 |
| Iron car axles | 26.00 to 26.50 |
| Steel car axles | 21.50 to 22.00 |
| Wrought arch bars and transoms | 19.00 to 19.50 |
| No. 1 railroad wrought | 16.00 to 16.50 |
| No. 2 railroad wrought | 14.00 to 14.50 |
| Railroad springs | 15.00 to 15.50 |
| Steel couplers and knuckles | 15.00 to 15.50 |
| Locomotive tires, 42 in. and over smooth inside | 14.50 to 15.00 |
| No. 1 dealers' forge | 11.50 to 12.00 |
| Cast iron borings | 7.50 to 8.00 |
| No. 1 busheling | 13.50 to 14.00 |
| No. 1 boilers cut to sheets and rings | 11.00 to 11.50 |
| No. 1 railroad cast | 20.00 to 20.50 |
| Stove plate and light cast | 15.50 to 16.00 |
| Railroad malleable | 13.50 to 14.00 |
| Pipes and flues | 11.00 to 11.50 |
| Heavy railroad sheet and tank | 10.00 to 10.50 |
| Railroad grate bars | 12.00 to 12.50 |
| Machine shop turnings | 6.50 to 7.00 |
| Country mixed | 11.00 to 11.50 |
| Uncut railroad mixed | 12.50 to 13.00 |
| Horseshoes | 14.50 to 15.00 |

**Finished Iron and Steel.**—Finished products, although showing the effects of the uncertainty created by the deadlock at Washington, are evidencing some improvement as a result of the growth of needs for structural purposes and more and more construction work is making itself apparent, though it has not yet reached anything like its anticipated level. Building is being forced along by actual needs and this is expected to add to the improvement in the general tone. Movement out of warehouse is getting better and we quote for stock out of warehouse as follows:

Soft steel bars, 3.44c.; iron bars, 3.44c.; structural material, 3.54c.; tank plates, 3.74c.; No. 8 blue annealed sheets, 4.59c.; No. 10 blue annealed sheets, 4.64c.; No. 28 black sheets, cold rolled, one pass, 5.44c.; No. 28 galvanized sheets, black sheet gage, 6.79c.

**Coke.**—Literally no business is being done in coke, the melters being sufficiently supplied by stocks in yards or by contracts. In some cases no business is now expected either in coke or pig iron before July 1, the half yearly period ending then.

## Cleveland

CLEVELAND, April 22.

**Iron Ore.**—Ore shippers and vessel men have agreed upon an 80c. per ton net rate on ore from the head of Lake Superior to lower Lake docks. This is a 20c. per ton reduction from the 1918 rate. Representatives of the Lake Carriers' Association, ore and other interests held a conference with the United States Shipping Board in Washington April 18, during which the Shipping Board approved the base rate as established, and at the same time approved a 42½c. per ton rate on coal to the head of the Lakes and on carrying rates for grain. The Shipping Board requested the continuance during this year's season of navigation of the mobilization committee of the Lake Carriers, which was organized as a war-time measure to increase the handling efficiency of the Lake boats. Following the fixing of charges on ore, a movement has been started to secure an advance from 10c. to 15c. on the charge for unloading ore at lower Lake ports. Some of the railroads are understood to be backing the efforts to secure an advance of the unloading rate, which was reduced from 15c. to 10c. in 1912. With the improved handling facilities, ore men contend that there is a large profit in unloading ore at the 10c. rate. This question of increasing the handling charges, which also includes a proposed advance of 2c. a ton on coal, will be taken up at a meeting of a committee composed of the various interests, to be held in Pittsburgh, April 25. Following the establishment of the base rate from the head of the Lakes, a committee of iron ore and vessel interests has decided to make a general corresponding reduction of 20 per cent in carrying charges from other ports, making the rate 72c. from Marquette and 60c. from Escanaba to Lake Erie ports, and 48c. from Escanaba to South Chicago and Milwaukee. Formerly the Escanaba rate was 15c. and the Marquette rate 5c. lower than the Duluth rate, but in 1917 the Escanaba differential was made 25c. and the Marquette differential 10c. Some ore sales are being made, but not in large tonnages. However, enough has already been sold to establish the market at the prices placed in effect last year, subject to the advantage in reduced carrying charges which goes to the buyer. With the unloading rates not yet determined, contracts are being made at the prices named late last year with a rider in the contract, giving the buyer the benefit of reduced vessel rates. If the unloading charge is increased 5c., this additional cost will fall on the consumer, leaving only a net gain of 15c. per ton on ore for the blast furnace. Salesmen have canvassed the Eastern trade but find no disposition in the East at present to buy ore. Usually the first call for ore is for the Bessemer grades, but so far merchant firms report no sales of Bessemer ore.

In spite of the blowing out of many furnaces recently, the amount of ore on docks and in furnace yards May 1 will show a falling off of about 1,500,000 tons, as compared with the same day a year ago. This estimate is based on actual figures to April 1, and on estimated pig iron production in April of 2,250,000 tons. With this estimate for April, pig iron production this year to May 1 will be slightly in excess of the same

period in 1918, when poor coke and other handicaps tended to curtail the output.

We quote delivered f.o.b., lower Lake ports, subject to reduction in carrying charges, as follows:

Old range Bessemer, $6.65; old range non-Bessemer, $5.90; Mesaba Bessemer, $6.40; Mesaba non-Bessemer, $5.75

**Pig Iron.**—Readjustments of pig iron contracts giving consumers the benefit of the present prices have finally been made by nearly all of the Cleveland producers. The plans adopted by the furnace companies to meet the conditions are not uniform, but they have practically the same effect. At least two interests have protected themselves in case prices should advance. One interest is substituting new contracts which provide that for foundry iron the present $26.75 price shall be a minimum and the last Government price of $31 shall be a maximum and that if the price advances between the two extremes the buyer shall pay the ruling price at the time of shipment. The new contracts of another seller provide that the iron shall be billed at the price he is quoting at the time of shipment. Another company has made new contracts at present prices for the same tonnages as are covered by old contracts, but has not canceled its old contracts. The market is very dull. All sales reported during the week were for small lots and none for delivery beyond the second quarter. Some buyers are placing orders only for iron required within 30 days. One large interest reports sales during the week aggregating about 2200 tons. A few foundries are taking shipments a little better than they have been. Southern producers so far have declined to revise contracts to the present basis. We quote delivered Cleveland, as follows:

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|---|---|
| Bessemer | $29.35 |
| Basic | 27.15 |
| Northern No. 2 foundry | 27.15 |
| Southern No. 2 foundry, silicon 2.25 to 2.75 | 33.00 |
| Gray forge | 26.15 |
| Ohio silvery | 42.65 |
| Standard low phos., Valley furnace | 45.75 |

**Coke.**—The coke market is very dull, sales being limited to small lots of foundry coke for early shipment. We quote standard Connellsville foundry coke at $5.25 to $5.75 per net ton at oven.

**Finished Iron and Steel.**—Consumers of finished iron and steel are marking time waiting for a straightening out of the price tangle in Washington, and buying is confined largely to small orders for immediate requirements, which are coming for the most part from the automobile industry. The price uncertainty has not materially affected the placing of orders by the large automobile manufacturers who are continuing to buy steel for about 90 days' requirements. One Detroit automobile manufacturer has just placed 1500 tons of alloy steel with an Ohio mill, and new inquiries for a considerable tonnage of alloy steel are pending. However, some of the automobile plants have accumulated good stocks and have further cut down shipping orders, necessitating the curtailment of operations this week by some of the Ohio mills that are rolling this steel. Considerable steel business is apparently backing up, as consumers are not confident that present prices will be maintained and are withholding purchases. Some manufacturers of farm tractors have curtailed production and the demand for steel from the agricultural implement trade is light, as it is between seasons in this field. The demand for wire is active. Regular prices on steel bars and structural material are apparently being maintained. There are reports of shading on plates and sheets, but these lack confirmation. Outside of standard products, more or less price shading is going on. A New York export house is inquiring for 6000 tons of ship plates and is asking for a quotation around $52.50 delivered New York, or about $10 under the market, to meet English competition. In structural lines, an inquiry for 800 tons of material has come out for an automobile plant in Kokomo, Ind. Sheets are in light demand and Ohio mills are running at about 50 per cent of capacity. Hard steel bars are weak and while 2.25c. is now the general quotation, this price can probably be shaded. There is practically no demand for bar iron and some of the local mills are not operating. Warehouse prices are as follows:

Steel bars, 3.27c.; plates, 3.57c.; structural shapes, 3.87c.; bands and hoops, 3.97c.; No. 10 blue annealed sheets, 4.47c.; No. 28 black sheets, 5.27c.; No. 28 galvanized sheets, 6.62c.

**Bolts, Nuts and Rivets.**—Bolt and nut makers are getting a fair volume of orders, but these are for small lots for immediate requirements. Prices are being firmly maintained. Demand for rivets is very light, and makers are now cleaning up old orders. Regular prices are being quoted.

**Old Material.**—The scrap market has shown more activity during the past week owing to the fact that the American Steel & Wire Co. came into the market for a round tonnage of material and another Cleveland consumer was an active buyer. Sales to consumers as estimated aggregated 10,000 or more tons on heavy steel borings, trimmings and compressed steel screws. It is stated that the mills were not in need of this scrap, but decided in view of the prevailing low prices to add to their stocks. These sales did not have a stimulating effect upon prices, which are staying at about recent levels. Heavy melting steel on sales to mills has brought $15 to $15.50, but $15.25 appears to be the maximum price to-day, and this price is being offered to cover on short sales. While as high as $13.75 has been offered for compressed steel scrap, the price on this grade appears to have eased off somewhat. Dealers are finding no market for busheling. We quote delivered consumers' yards in Cleveland and vicinity, as follows:

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|---|---|
| Heavy melting steel | $15.00 to $15.25 |
| Steel rails, under 3 ft. | 17.00 to 19.00 |
| Steel rails, rerolling | 15.50 to 16.00 |
| Iron rails | 23.00 to 24.00 |
| Iron car axles | 29.50 to 30.00 |
| Steel car axles | 27.50 to 28.50 |
| Low phosphorus melting scrap | 16.25 to 17.00 |
| Cast borings | 9.50 to 10.00 |
| Iron and steel turnings and drillings | 8.25 to 8.75 |
| Compressed steel | 12.50 to 13.00 |
| No. 1 railroad wrought | 17.00 to 17.50 |
| Cast iron car wheels | 22.00 to 22.50 |
| Agricultural malleable | 14.00 to 15.00 |
| Railroad malleable | 17.00 to 17.50 |
| Steel axle turnings | 13.00 to 13.50 |
| Light bundled sheet scrap | 10.00 to 11.00 |
| No. 1 cast | 22.00 to 23.00 |
| No. 1 busheling | 13.00 to 13.50 |
| Drop forge flashings, 10 in. and under | 13.00 to 13.50 |
| Drop forge flashings, over 10 in. | 9.50 to 10.00 |
| Railroad grate bars | 16.00 to 16.50 |
| Stove plate | 16.75 to 17.50 |

## Cincinnati

CINCINNATI, April 22.—(*By Wire.*)

**Coke.**—Reports from all selling agencies are simply reiterations of statements that have been made during the past four weeks. Consumers who have not provided for a supply in the last half are not now willing to come into the market and pay present prices, nor are they inclined to make contracts on a sliding scale basis using pig iron prices as a base. The putting out of blast furnaces in different parts of the country has cut down the consumption of furnace coke to a point where the oven operators have also had to materially reduce their output. This is especially true in the Connellsville district. No changes in prices are noted and Connellsville 48-hr. coke is around $4 per net ton at oven, but this figure can be shaded on some brands for prompt shipment. Connellsville foundry coke remains around $5 to $5.50. Pocahontas and Wise County furnace coke is quoted around $5 and foundry coke from $6 to $7. No sales are reported at these figures.

**Pig Iron.**—The differences that have arisen at Washington have been discounted and selling agencies have received intimations from furnace operators that business should be conducted more nearly on a pre-war basis. Neither the Southern nor the Hanging Rock furnaces have reduced foundry iron below $26.75 on the ground that their production costs are now too high to admit any cutting down of quotations without entailing substantial losses on every ton of iron sold. Some Virginia iron that was offered below the schedule has been

withdrawn. It is also stated that some makers of basic, who were willing to shade the market price, are not now disposed to take on any future business below $25.75 at furnace. Foundry iron melters have large stocks on hand or contracted for and it is estimated that foundry iron stocks in the hands of consumers are larger than those held by producers. The blowing out of Southern furnaces has cut down production in the Birmingham district to an amount smaller than it has been within the past ten years. A further curtailment is also anticipated in Southern Ohio. Ohio silvery irons that were in demand last month are not now wanted, but no changes in prices are noted.

Based on freight rates of $3.60 from Birmingham and $1.80 from Ironton, we quote, f.o.b. Cincinnati:

| | |
|---|---|
| Southern coke, silicon 1.75 to 2.25 (base price) | $30.35 |
| Southern coke, silicon 2.25 to 2.75 (No. 2 soft) | 31.60 |
| Southern gray forge | 29.35 |
| Ohio silvery, 8 per cent silicon | 42.05 |
| Southern Ohio coke, silicon 1.75 to 2.25 (No. 2) | 28.55 |
| Basic, Northern | 27.55 |
| Standard Southern carwheel | 51.60 |

**Fluorspar.**—There is a wide range between quotations on washed gravel fluorspar and prices given are from $25 to $30 per ton at point of shipment. The first figure is nearer correct than the latter one. Very few sales have been made recently and some cancellations of contracts are reported on the part of furnaces which have shut down.

**Finished Material.**—Jobbers state that they have never known the trade to buy in such small lots as they are doing at the present time. For this reason drayage expense is now quite an item owing to the cost of filling so many small orders. Shipments from the mills are coming in more freely, and in some cases the warehouse firms have asked that they be held up. Wire fencing is in very good demand, but wire nails are moving slowly. Galvanized sheets are being bought in small quantities, but no contracting ahead of consequence is being done. Both cast iron and steel pipe is in good demand.

The following are present local jobbers' prices: Steel and iron bars, 3.33c. base; bands, 4.03c. base; structural shapes, 3.43c. base; plates, ¼-in. and heavier, 3.63c. base; No. 10 blue annealed sheets, 4.53c., and wire nails, $3.85 per keg base.

**High-Speed Steel.**—Business shows a little improvement and automobile manufacturers are buying freely. Practically all purchases made now are for prompt shipment, and no contracting of consequence is reported. Standard brands are held around $1.70, but this price has been shaded by some makers.

**Old Material.**—All dealers report business as being exceedingly dull, and with the exception of a small advance on cast iron borings and steel turnings, all prices are unchanged. Dealers are watching closely the pig iron market, and state that they are not willing to stock up heavily until more definite information is obtainable as to what the future situation will be. The following are dealers' prices in carload lots, f.o.b. yards Southern Ohio and Cincinnati:

*Per Gross Ton*

| | |
|---|---|
| Bundled sheet | $9.50 to $10.00 |
| Old iron rails | 22.50 to 23.00 |
| Relaying rails, 50 lb. and up | 40.00 to 41.00 |
| Rerolling steel rails | 14.00 to 14.50 |
| Heavy melting steel | 13.00 to 13.50 |
| Steel rails for melting | 13.00 to 13.50 |
| Old carwheels | 15.50 to 16.00 |
| No. 1 railroad wrought | 14.00 to 14.50 |

*Per Net Ton*

| | |
|---|---|
| Cast borings | $5.50 to $6.00 |
| Steel turnings | 5.50 to 6.00 |
| Railroad cast | 15.50 to 16.00 |
| No. 1 machinery | 17.00 to 17.50 |
| Burnt scrap | 11.00 to 11.50 |
| Iron axles | 23.00 to 23.50 |
| Locomotive tires (smooth inside) | 14.00 to 14.50 |
| Pipes and flues | 10.50 to 11.00 |
| Malleable cast | 11.00 to 11.50 |
| Railroad tank and sheet | 9.00 to 9.50 |

The offices of John C. Wallace, Jr., iron and steel products, have been removed to room 1502 Oliver Building, Pittsburgh.

# British Iron and Steel Market

## Higher British Domestic Prices—Pig Iron More Active—German February Outputs

*(By Cable)*

LONDON, ENGLAND, April 22.

Business in pig iron is active with more inquiry for forward delivery as well as for export. The South Wales Association of Tin-Plate Merchants strongly opposes the establishment of a central selling agency. The tin plate market is idle. New steel prices for the domestic trade are as follows:

| | | |
|---|---|---|
| Ship, bridge and tank plates | £17 0s. | ($79.22) |
| Structural material | £16 10s. | ($76.89) |
| Round, squares and flats | £19 0s. | ($88.54) |
| Heavy rails, net | £15 0s. | ($69.90) |

Export prices will be open to individual negotiation.

The North-Eastern Steel Works have been closed for reconstruction operations and probably will not reopen this year.

The German pig-iron output for February was 469,000 metric tons and that for steel was 439,000 tons.

Following are the Government fixed prices, good until May 1, per gross ton, except where otherwise stated, f.o.b. makers' works, with American equivalents figured at $4.66 for £1, tin plate, however, not being under control:

| | Domestic | | Export | |
|---|---|---|---|---|
| | £ s. d. | | £ s. d. | |
| Pig iron: | | | | |
| East Coast Bessemer | 6 2 6 | $28.55 | 8 12 6 | $40.20 |
| West Coast Bessemer | 6 7 6 | 29.71 | 8 17 6 | 41.36 |
| Malleable Bessemer | 6 17 6 | 31.92 | 9 7 6 | 43.57 |
| Cleveland No. 3 foundry | 4 15 0 | 22.13 | 7 5 0 | 33.78 |
| Cleveland forge | 4 15 0 | 22.13 | 7 5 0 | 33.78 |
| Scottish No. 3 foundry | 5 14 0 | 26.56 | 8 4 0 | 38.21 |
| Cleveland basic | 5 0 0 | 23.30 | 7 10 0 | 34.95 |
| Coke (Durham): | | | | |
| Furnace | 1 13 0 | 7.69 | ..... | ..... |
| Foundry | 1 18 0 | 8.86 | ..... | ..... |
| Ferromanganese | 25 0 0 | 116.50 | 30 0 0 | 139.80 |
| Billets and slabs: | | | | |
| Rolling | 12 5 0 | 57.08 | 13 10 0 | 62.91 |
| Forging | 13 7 6 | 62.33 | 15 0 0 | 69.90 |
| Tin plate bars | 12 5 2 | 57.12 | 12 17 6 | 60.00 |
| Rails, 60 lb. and upward | 13 7 6 | 62.33 | 15 10 0 | 72.23 |
| Steel bars | 16 10 0 | 76.89 | 18 10 0 | 86.21 |
| Large rounds, etc | 14 5 0 | 66.40 | 17 10 0 | 81.55 |
| Structural material | 13 12 6 | 63.50 | 16 2 6 | 75.15 |
| Plates | 14 0 0 | 65.24 | 16 10 0 | 76.89 |
| Plates, thin | 16 0 0 | 74.56 | 19 10 0 | 90.87 |
| Plates, boiler | 15 0 0 | 69.90 | 17 10 0 | 81.55 |
| Bar iron | 17 15 0 | 82.71 | 20 0 0 | 93.20 |
| Tin plates, 14 x 20 coke, 112 sheets, 108 lb., f.o.b. Wales | 33 10½ | 7.90 | ..... | ..... |

## Steel Company of Canada Earnings

Lower earnings were made by the Steel Co. of Canada, Hamilton, Ont., last year, but the annual statement shows the company to be in a strong financial position. Gross profits for the year were $5,367,120 as compared with $6,040,318 in 1917. After deductions for fire insurance, reserve, pension fund, etc., there remains available for dividends on $11,500,000 of common stock outstanding the sum of $1,815,017, or equal to 15.7 per cent, as compared with 19.5 per cent in 1917. The balance brought forward to profit and loss account at the end of the year was $1,125,017, making the credit of that account now $7,322,872, or over 40 per cent of the combined preferred and common stock outstanding.

"After the signing of the armistice," says President Robert Hobson, "there was a decided slump in value of raw material and manufactured products, and at the date of writing this report the United States Government is further regulating prices. It is needless to say that the effects of any drop in prices in the United States are immediately reflected in Canada. We were, therefore, compelled to carefully scrutinize every value, and we have placed what we consider a sound and proper value of each item of our inventory."

During the year the company's plants were fully occupied, but the booking of orders commenced to decrease immediately the armistice was signed. Considerable advances in wages to employees were made during 1918. The company has purchased 1617 acres of coal lands for $1,089,694, and in this is included a bond issue for $450,000 which existed on one of the properties.

# IRON AND INDUSTRIAL STOCKS

## Victory Loan Figures and Favorable Peace Prospects Buoy Up Market

NEW YORK, April 21.

The stock market maintained its price level last week as a result of several favorable factors, the most important being the announcement that the Victory Loan would be for only $4,500,000,000 and would carry 4¾ per cent. The fact that there remained a possibility of a reconciliation of the Railroad Administration and the Industrial Board as regards rail and other steel prices, and predictions of approaching a peace settlement in Paris tended somewhat to strengthen securities.

The range of prices in active iron and industrial stocks from Tuesday of last week to Wednesday of this week was as follows:

| | | | |
|---|---|---|---|
| Allis-Chalm. com. | 37⅛- 39⅜ | Int. Har. com. | 126½-135½ |
| Allis-Chalm. pf. | 92½- 94¾ | Int. Har. pf. | 116½ |
| Am. Can com. | 51 - 53⅝ | Lackaw. Steel | 70 - 71½ |
| Am. Can pf. | 102 -102⅛ | Lake Supr. Corp. | 19½- 20 |
| Am. Car & F. c. | 93⅝- 96⅛ | Midvale Steel | 45⅝- 46⅞ |
| Am. Car & F. pf. | 116½-117 | Nat.-Acme | 37½- 39¼ |
| Am. Loco. com. | 67½- 71¼ | Nat. En. & St. c. | 57½- 60½ |
| Am. Loco. pf. | 104¼-104½ | Nat. En. & St. pf. | 99 - 99¼ |
| Am. Radiator c. | 275 | N. Y. Air Brake | 109½-111⅞ |
| Am. Ship com. | 110½-118¾ | Nova Scotia Steel | 50 - 50½ |
| Am. Steel Fdries. | 82 - 96¾ | Pressed Steel c. | 71½- 74¼ |
| Bald. Loco. com. | 90¾- 94½ | Pressed Steel pf. | 100 -100⅛ |
| Bald. Loco. pf. | | Ry. Steel Spg. c. | 81 - 87 |
| Beth. Steel com. | 75 - 76½ | Ry. Steel Spg. pf. | 106¾ |
| Beth. Steel cl. B. | 73⅝- 77½ | Republic com. | 80⅝- 84 |
| Case, J. L., pf. | 97 - 99 | Republic pf. | 102 -102⅜ |
| Chic. Pneu. Tool. | 67 | Sloss com. | 53 - 54 |
| Colo. Fuel | 42¼- 44 | Superior Steel | 39 - 39½ |
| Crucible Steel c. | 66⅝- 69½ | Transue-Williams | 45 - 48 |
| Crucible Steel pf. | 94½- 97 | Un. Alloy Steel | 46¼- 47 |
| Gen. Electric | 160 -164 | U. S. Pipe com. | 22⅜- 26¼ |
| Gt. No. Ore Cert. | 42 - 45 | U. S. Pipe pf. | 58⅞- 66 |
| Gulf States Steel. | 51¾- 53¾ | U. S. Steel com. | 98⅛-100¼ |
| Harb-Walk Ref. c. | 118 | U. S. Steel pf. | 116⅜-116¾ |
| Harb-Walk R. pf. | 100 | Westingh. Elec. | 48 - 49⅝ |

## Dividends

The Cleveland-Cliffs Iron Co., 2½ per cent, payable April 25.

The National Enameling & Stamping Co., quarterly, 1½ per cent on the common, payable May 31.

The Sloss-Sheffield Steel & Iron Co., quarterly, 1½ per cent on the common, payable May 10.

The Taylor-Wharton Iron & Steel Co., quarterly, 1¾ per cent on the preferred, payable May 1.

The Warwick Iron & Steel Co., quarterly, 30c., payable May 15.

## Carbon Steel Co. Earnings

The statement of earnings of the Carbon Steel Co., Pittsburgh, for the six months ended March 31, 1919, follows:

| | | |
|---|---|---|
| Balance surplus Oct. 1, 1918 | | $3,187,857.74 |
| Net profits for the six months ending March 31, 1919, after deducting reserves for Federal income and war excess profits taxes | | 1,595,894.51 |
| Total surplus | | $4,783,752.25 |
| Deduct for dividends | $430,000.00 | |
| Subscription to United War Work Fund | 10,000.00 | |
| Redemption premium 20-yr. 5 per cent S. F. gold bonds | 7,650.00 | |
| Cost and inventory adjustments | 132,813.39 | |
| | | $580,463.39 |
| Balance surplus March 31, 1919 | | $4,203,288.86 |

President Charles McKnight, in his statement to stockholders, says in part:

"Pending final settlement of your company's claims against the Government under its settlement contract, operations of the plant have been temporarily suspended, and advantage has been taken of the opportunity to complete the several extensions and improvements which were under way at the time the armistice was signed. Your company, with the return of normal business conditions, will be enabled to proceed with its usual line of work and to take care of the requirements of its customers in a most satisfactory manner."

## Canadian Steel Companies

TORONTO, ONT., April 21.—What the war has done to place Canada's large steel companies in a strong financial position may be seen by a study of the reports of the larger companies for 1914 and 1918. At the beginning of the war the steel industry was languishing somewhat, with relatively small, quick assets. This has been greatly changed by the great business that has come to them during the war, leaving their position many times stronger. The following table is a comparison of current liabilities and current assets, with surplus in each case for 1914 and 1918. In the case of the Dominion Iron & Steel Co. and the Algoma Steel Corporation the figures are not strictly up-to-date, as the financial year of the former ended on March 31 of last year and the Algoma Steel on June 30 last.

| 1914 | Current Liabilities | Current Assets | Surplus |
|---|---|---|---|
| Dominion Iron & Steel Co. | $4,222,082 | $8,495,363 | $4,273,281 |
| Algoma Steel Corporation | 3,464,357 | 6,352,333 | 2,887,976 |
| Nova Scotia Steel & Coal Co., Ltd. | 2,622,723 | 2,777,606 | 154,883 |
| Steel Company of Canada | 1,375,627 | 6,479,770 | 5,104,143 |
| **1918** | | | |
| Dominion Iron & Steel Co. | $3,381,346 | $21,085,205 | $17,703,859 |
| Algoma Steel Corporation | 3,059,826 | 11,147,259 | 8,089,433 |
| Nova Scotia Steel & Coal Co., Ltd. | 1,403,750 | 11,468,828 | 10,065,078 |
| Steel Company of Canada | 3,706,154 | 15,928,358 | 12,222,204 |

## Industrial Finances

The first quarterly report for 1919 of the Republic Iron & Steel Co. shows a surplus after charges and Federal taxes of $1,053,956, compared with $3,021,768 of the corresponding period of 1918. This means a contrast per share of $2.26 in 1919 with $9.50 in 1918.

An application for a receivership of the Pusey & Jones Co., operator of shipyards at Gloucester City, N. J., Chester, Pa., and Wilmington, Del., was filed with the Federal judge in Trenton, N. J., April 18, in behalf of Bleakly Brothers, stationers, Camden, N. J., who declare bills of $7,000 against the concern. Arguments will be heard April 28. Mortgages are held by Former United States Senator Baird for $150,000, the Delaware Trust Co., Wilmington, Del., for $500,000, and the Emergency Fleet Corporation for $5,000,000. The Pusey & Jones Co. has an authorized capital of $40,000,000. The order for receivership also seeks to restrain operations. Between 6000 and 7000 workmen will be thrown out of employment at Gloucester City if the order is granted.

The reorganization of the Winchester Repeating Arms Co. was completed last week with its incorporation under the laws of Connecticut, to take over the stock of the depositing stockholders of the Winchester Repeating Arms Co., amounting to about 97 per cent of the total stock of the company. Among the new personnel of officials are T. G. Bennett, director, and former president of the company, now chairman of the board; J. E. Otterson, director and president; other directors, L. K. Liggett, United Drug Co., and C. S. Sargent, Jr., Kidder, Peabody & Co.

On April 16 an involuntary petition in bankruptcy was filed against the Louisville Steel & Iron Co., Louisville, Ky., asking that a receiver be appointed for the company, and alleging that with liabilities of approximately $200,000 the company was unable to meet its payroll and had committed acts of bankruptcy in favoring certain creditors. The Federal Court decided that it was necessary to appoint a custodian to take charge, but action on appointment was delayed until April 23.

The stockholders of American Steel Foundries Co. voted unanimously for the proposed increase in capitalization from $17,184,000 to $42,184,000 at a meeting Tuesday. President Lamont stated that the chances of a dividend on the new common stock should be better than ever. "Our business at present depends almost entirely on the railroad equipment situation," he continued.

The report of the Lackawanna Steel Co. for the first quarter of 1919 shows profits of $1,207,109 or $3.43 a share on capital stock, compared with $6.48 in the corresponding period last year. Unfilled orders March 31 amounted to 124,570 gross tons, compared with 708,109 tons at this date in 1918.

# Prices Finished Iron and Steel, f.o.b. Pittsburgh

Freight rates from Pittsburgh on finished iron and steel products, including wrought iron and steel pipe, with revisions effective Nov. 1, 1918, in carloads, to points named, per 100 lb., are as follows: New York, 27c.; Philadelphia, 24.5c.; Boston, 30c.; Buffalo, 17c.; Cleveland, 17c.; Cincinnati, 23c. Indianapolis, 25c.; Chicago, 27c.; St. Louis, 34c.; Kansas City, 59c.; St. Paul, 49½c.; Denver 99c.; Omaha, 59c minimum carload, 36,000 lb. to four last named points; New Orleans, 38.5c.; Birmingham, 57.5c.; Pacific Coast, $1.25; minimum carload, 80,000 lb. To the Pacific Coast the rate on steel bars and structural steel is $1.315, mimimum carload 40,000 lb.; and $1.25, minimum carload 50,000 lb. On wrought iron and steel pipe the rate from Pittsburgh to Kansas City is 50c. per 100 lb., minimum carload 46,000 lb.; to Omaha, 50c.; minimum carload 46,000 lb.; to St. Paul and Minneapolis, 49.5c., minimum carload 46,000 lb.; Denver, 99c., minimum carload 46,000 lb. A 3 per cent transportation tax applies. On iron and steel items not noted above, rates vary somewhat and are given in detail in the regular railroad tariffs.

### Structural Material

I-beams, 3 to 15 in.; channels, 3 to 15 in.; angles, 3 to 6 in. on one or both legs, ¼ in. thick and over, and zees, structural sizes, 2.80c.

### Wire Products

Wire nails, $3.50 base per keg; galvanized, 1 in. and longer, including large-head barb roofing nails taking an advance over this price of $2, and shorter than 1 in., $2.50. Bright basic wire, $3.35 per 100 lb.; annealed fence wire, Nos. 6 to 9, $3.25; galvanized wire, $3.95; galvanized barb wire and fence staples, $4.35; painted barbed wire, $3.65; polished fence staples, $3.65; cement-coated nails, $3.40 base; these prices being subject to the usual advances for the smaller trade, all f.o.b. Pittsburgh, freight added to point of delivery, terms 60 days net, less 2 per cent off for cash in 10 days. Discounts on woven-wire fencing are 58 per cent off list for carload lots, 57 per cent for 1000-rod lots, and 56 per cent off for small lots, f.o.b. Pittsburgh.

### Bolts, Nuts and Rivets

| | |
|---|---|
| Large structural and ship rivets | $4.20 base |
| Large boiler rivets | $4.30 |
| 7/16 in. x 6 in. smaller and shorter rivets | 50-10 per cent off list |
| Machine bolts, h.p. nuts, ⅜ in. x 4 in.: | |
| Smaller and shorter, rolled threads | 50-10-5 per cent off list |
| Cut threads | 50-5 per cent off list |
| Larger and longer sizes | 40-10 per cent off list |
| Machine bolts, c.p.c. and t. nuts, ⅜ in. x 4 in.: | |
| Smaller and shorter | 40-10 per cent off list |
| Larger and longer | 35-5 per cent off list |
| Carriage bolts, ⅜ in. x 6 in.: | |
| Smaller and shorter, rolled threads | 50-5 per cent off list |
| Cut threads | 40-10-5 per cent off list |
| Larger and longer sizes | 40 per cent off list |
| Lag bolts | 50-10 per cent off list |
| Plow bolts, Nos. 1, 2, 3 | 50 per cent off list |
| Hot pressed nuts, sq., blank | 2.50c. per lb. off list |
| Hot pressed nuts, hex., blank | 2.30c. per lb. off list |
| Hot pressed nuts, sq., tapped | 2.30c. per lb. off list |
| Hot pressed nuts, hex., tapped | 2.10c. per lb. off list |
| C.p.c. and t. sq. and hex. nuts, blank | 2.25c. per lb. off list |
| C.p.c. and t. sq. and hex. nuts, tapped | 2.00c. per lb. off list |
| Semi-finished hex. nuts: | |
| ⅝ in. and larger | 60-10-10 per cent off list |
| 9/16 in. and smaller | 70-5 per cent off list |
| Stove bolts | 70-10 per cent off list |
| Stove bolts | 2½ per cent extra for bulk |
| Tire bolts | 50-10-5 per cent off list |

The above discounts are from present lists now in effect. All prices carry standard extras.

### Wire Rods

No. 5 common basic or Bessemer rods to domestic consumers, $57; chain rods, $65; screw, rivet and bolt rods and other rods of that character, $65. Prices on high carbon rods are irregular. They range from $70 to $80, depending on carbons.

### Railroad Spikes and Track Bolts

Railroad spikes 9/16 in. x 4½ in. and heavier, per 100 lb., $3.70, in lots of 200 kegs of 200 lb. each or more; track bolts, $4.90. Boat spikes, $5.05 per 100 lb., f.o.b. Pittsburgh.

### Terne Plate

Prices of terne plate are as follows: 8-lb. coating, 200 lb., $14.50 per package; 8-lb. coating, I. C., $14.80; 12-lb. coating, I. C., $16.50; 15-lb. coating, I. C., $17.50; 20-lb. coating, I. C., $18.75; 25-lb. coating, I. C., $20.00; 30-lb. coating, I. C., $21.00; 35-lb. coating, I. C., $22.00; 40-lb. coating, I. C., $23.00 per package, all f.o.b. Pittsburgh, freight added to point of delivery.

### Iron and Steel Bars

Steel bars at 2.70c. from mill. Refined iron bars, 3.00c.; common iron bars, 3.50c. in carload and larger lots, f.o.b. mill.

### Wrought Pipe

The following discounts are to jobbers for carload lots on the Pittsburgh basing card.

*Butt Weld*

| Steel: Inches | Black | Galv. | Iron: Inches | Black | Galv. |
|---|---|---|---|---|---|
| ⅛, ¼ and ⅜ | 47 | 20½ | ⅛ and ¼ | 26 | +1 |
| ½ | 51 | 36½ | ⅜ | 27 | List |
| ¾ to 3 | 54 | 40½ | ½ | 31 | 19 |
| | | | ¾ to 1½ | 36 | 29 |

*Lap Weld*

| | | | | | |
|---|---|---|---|---|---|
| 2 | 47 | 34½ | 1¼ | 21 | 5 |
| 2½ to 6 | 50 | 37½ | 1½ | 28 | 14 |
| 7 to 12 | 47 | 33½ | 2 | 29 | 15 |
| 13 and 14 | 37½ | .. | 2½ to 6 | 31 | 18 |
| 15 | 35 | .. | 7 to 12 | 28 | 14 |

*Butt Weld, extra strong, plain ends*

| | | | | | |
|---|---|---|---|---|---|
| ⅛, ¼ and ⅜ | 43 | 25½ | ⅛, ¼ and ⅜ | 25 | 8 |
| ½ | 48 | 35½ | ½ | 30 | 17 |
| ¾ to 1½ | 52 | 39½ | ¾ to 1½ | 36 | 24 |
| 2 to 3 | 53 | 40½ | | | |

*Lap Weld, extra strong, plain ends*

| | | | | | |
|---|---|---|---|---|---|
| 2 | 45 | 33½ | 1¼ | 22 | 1 |
| 2½ to 4 | 48 | 36½ | 1½ | 28 | 14 |
| 4½ to 6 | 47 | 35½ | 2 | 30 | 17 |
| 7 to 8 | 43 | 29½ | 2½ to 4 | 32 | 20 |
| 9 to 12 | 38 | 24½ | 4½ to 6 | 31 | 19 |
| | | | 7 to 8 | 23 | 11 |
| | | | 9 to 12 | 18 | 6 |

To the large jobbing trade an additional 5 per cent is allowed over the above discounts, which are subject to the usual variations in weight of 5 per cent.

On butt and lap weld sizes of black iron pipe, discounts for less than carload lots to jobbers have been seven (7) points lower (higher price) than carload lots, and on butt and lap weld galvanized iron pipe have been nine (9) points lower (higher price).

### Boiler Tubes

The following are the prices for carload lots, f.o.b. Pittsburgh:

| *Lap Welded Steel* | Per Net Ton | *Charcoal Iron* | Per Net Ton |
|---|---|---|---|
| 3½ to 4½ in. | 37 | 3½ to 4½ in. | 12½ |
| 2½ to 3¼ in. | 27 | 3 to 3¼ in. | + 2 |
| 2¼ in. | 20½ | 2½ to 2¾ in. | + 4½ |
| 1¾ in. to 2 in. | 16 | 2 to 2¼ in. | +15½ |
| | | 1¾ to 1⅞ in. | +32 |

*Standard Commercial Seamless—Cold Drawn or Hot Rolled*

| Per Net Ton | | Per Net Ton | |
|---|---|---|---|
| 1 in. | $334 | 1¾ in. | $214 |
| 1¼ in. | 274 | 2 to 2½ in. | 184 |
| 1⅜ in. | 264 | 2¾ to 3¾ in. | 174 |
| 1½ in. | 214 | 4 in. | 194 |
| | | 4½ to 5 in. | 214 |

These prices do not apply to special specifications for locomotive tubes nor to special specifications for tubes for the Navy Department, which will be subject to special negotiation.

### Sheets

Makers' price for mill shipments on sheets of United States standard gage in carload and larger lots are as follows:

| | Cents per lb |
|---|---|
| *Blue Annealed—Bessemer* | |
| No. 8 and heavier | 3.85 |
| Nos. 9 and 10 (base) | 3.80 |
| Nos. 11 and 12 | 3.95 |
| Nos. 13 and 14 | 4.00 |
| Nos. 15 and 16 | 4.10 |
| *Box Annealed, One Pass Cold Rolled—Bessemer* | |
| Nos. 17 to 21 | 4.50 |
| Nos. 22 and 24 | 4.55 |
| Nos. 25 and 26 | 4.60 |
| No. 27 | 4.65 |
| No. 28 (base) | 4.70 |
| No. 29 | 4.80 |
| No. 30 | 4.90 |
| *Galvanized Black Sheet Gage—Bessemer* | |
| Nos. 10 and 11 | 5.05 |
| Nos. 12 and 14 | 5.15 |
| Nos. 15 and 16 | 5.30 |
| Nos. 17 to 21 | 5.45 |
| Nos. 22 and 24 | 5.60 |
| Nos. 25 and 26 | 5.75 |
| No. 27 | 5.80 |
| No. 28 (base) | 6.05 |
| No. 29 | 6.20 |
| No. 30 | 6.55 |
| *Tin-Mill Black Plate—Bessemer* | |
| Nos. 15 and 16 | 4.50 |
| Nos. 17 to 21 | 4.55 |
| Nos. 22 to 24 | 4.60 |
| Nos. 25 and 27 | 4.65 |
| No. 28 (base) | 4.75 |
| No. 29 | 4.75 |
| No. 30 | 4.75 |
| Nos. 30½ and 31 | 4.80 |

# Metal Markets

## The Week's Prices

Cents Per Pound for Early Delivery

| | Copper, New York | | Tin, | Lead | | Spelter | |
|---|---|---|---|---|---|---|---|
| | Lake | Electrolytic | New York | New York | St. Louis | New York | St. Louis |
| Apr. 16 | 15.50 | 15.25 | 72.50 | 4.95 | 4.70 | 6.50 | 6.15 |
| 17 | 15.50 | 15.25 | 72.50 | 4.95 | 4.70 | 6.50 | 6.15 |
| 18 | 15.50 | 15.25 | 72.50 | 4.95 | 4.70 | 6.45 | 6.10 |
| 19 | 15.50 | 15.25 | .... | 4.95 | 4.70 | 6.45 | 6.10 |
| 21 | 15.50 | 15.25 | 72.50 | 4.95 | 4.70 | 6.40 | 6.05 |
| 22 | 15.50 | 15.25 | 72.50 | 4.95 | 4.70 | 6.40 | 6.05 |

NEW YORK, April 22.

Demand for all the metals is very light and prices are just about holding their own. Copper is nominally unchanged in a dull market. The tin situation continues stagnant and unsatisfactory. There is no demand for lead, but the price is firm. Spelter has declined slightly with practically no transactions. Antimony is very quiet.

### New York

Copper.—There has been no change in the copper market from that reported a week ago. Quotations are practically stationary at 15.25c., New York, for early delivery for electrolytic copper, with Lake copper nominal at about 15.50c., New York. Although some small producers are understood to be willing to shade this quotation about ⅛ to ¼c., in the absence of any demand to test the market these lower levels have not been established. The spurt of buying about three or four weeks ago is said to have met the demand of consumers for April and early May consumption, and the present lack of buying is thus explained. Buying for future delivery is neither considered wise nor do sellers favor committing themselves for such positions.

Tin.—The market continues absolutely dead, with very little of interest to report. The quantity of allocated metal still in the hands of the United States Steel Products Co. has not been determined. Metal for future shipment from the East after import restrictions are removed is quoted at about 49c., and there has been a small amount of buying at this level. The quotation still remains at 72.50c., New York, the Government fixed price, with American tin still unavailable and, by request, withdrawn from the market several weeks ago. There have been no arrivals of tin thus far in April because the United States Steel Products Co. has probably received its allotment.

Lead.—The market is still very dull and there has been no demand and practically no business transacted. Quotations are considered firm at 4.95c., New York, or 4.70c., St. Louis, in the outside market, with that of the leading interest still 5c., New York, and 4.70c., St. Louis. It is stated confidently that nothing better than these levels could be done even on an attractive inquiry. Many people in the trade blame the present inactivity in lead, as well as in copper and spelter, on the steel price situation.

Spelter.—The market for prime Western spelter is absolutely flat with no demand of any consequence from any source. The quotation has fallen to 6.05c., St. Louis, or 6.40c., New York, for early delivery with June and future shipments slightly higher. In the last week a small amount for delivery in June was sold at 6.15c., St. Louis. An interesting fact is that about 100 tons was recently sold for delivery in Australia and there is also in the market an inquiry for a small quantity for export to Japan. The fact that both of these countries are exporters and producers of spelter is the interesting phase of these sales and inquiries.

Antimony.—The metal is obtainable, duty paid, in wholesale quantities at 6.50c. to 6.62½c. for Asiatic grades.

Aluminum.—The quotation for No. 1 virgin metal, 98 to 99 per cent pure, is slightly higher at 30c. to 32c., New York, for early delivery.

**Old Metals.**—The market is very dull and prices are generally unchanged. Dealers' selling prices are nominally as follows:

| | Cents per lb. |
|---|---|
| Copper, heavy and crucible | 15.75 |
| Copper, heavy and wire | 14.50 |
| Copper, light and bottoms | 12.25 |
| Brass, heavy | 11.25 |
| Brass, light | 7.50 |
| Heavy machine composition | 15.00 |
| No. 1 yellow rod brass turnings | 8.25 |
| No. 1 red brass or composition turnings | 12.50 |
| Lead, heavy | 4.50 |
| Lead, tea | 3.75 |
| Zinc | 5.00 |

### St. Louis

APRIL 21—Nonferrous metals are quiet with a fair business and steady improvement in volume. Car load quotations are: Lead, 4.75c; spelter, 6c.; less than carloads, lead, 5c to 5.25c.; spelter, 6.50c.; tin, nominal with none available; copper, 16c. to 17c.; Asiatic antimony, 8c. In the Joplin district ores are lower with zinc blende, $35 to $37.50, basis 60 per cent metal; choice lots, $39; dead ore, 80 per cent, $55; calamine, 40 per cent, unchanged. On miscellaneous scrap metals we quote dealers' buying prices as follows: Light brass, 6.50c.; heavy yellow brass, 9.50c.; heavy red brass, 13c.; heavy copper and copper wire, 13c.; light copper, 10.50c.; pewter, 35c.; tinfoil, 40c.; tea lead, 3c.; zinc, 3c.; lead, 4c.; aluminum, 18c.

### Chicago

CHICAGO, April 21.—Although a little business has appeared from day to day, copper continues quiet, but producers hold firmly to their quotations. It is understood that their offerings are likely to be limited in expectation of higher price levels. Tin is unchanged and the supply, outside of that held by the United States Steel Products Co., is rapidly diminishing. The only price change announced by jobbers is in spelter, the quotation for which is a little lower. It is quiet and weak. Antimony is the strongest of the metals and has been fairly active. It has been in demand for future delivery but offerings are small because prices are close to cost. We quote copper at 16c. to 16.50c. for carloads; tin, 72.50c.; lead, 4.80c. to 4.87½c.; spelter, 6.15c. to 6.25c.; antimony, 8c. to 8.50c. On old metals we quote copper wire, crucible shapes, 13c.; copper clips, 12.50c.; copper bottoms, 11c.; red brass, 13c.; yellow brass, 8c.; lead pipe, 3.50c.; zinc, 4c.; pewter, No. 1, 32c.; tinfoil, 37c., and block tin, 50c., all these being buying prices for less than carload lots.

### Cincinnati

CINCINNATI, April 22.—Copper and brass scrap continue to show signs of strength, but no advances have been recorded within the past few days. Crucible copper is quoted around 13.50c. to 14c. and heavy copper from 13.25c. to 13.75c. Copper wire is unchanged around 13.50c. Block tin pipe is stronger at 58c. to 59c.

## Power Required to Make Ferroalloys

The power required to make a number of ferroalloys was recently tabulated in *La Houille blanche* by Director Flusin of the laboratory of electrochemistry and electrometallurgy of the University of Grenoble. His figures give the power, generated in water-power plants, in kilowatts per 24 hr. required per ton of product made, and also the number of tons of principal raw materials per ton of resultant product. Some of the figures are as follows:

| | Kw.-day per Ton | Tons of Materials to Ton of Product |
|---|---|---|
| Ferrosilicons: | | |
| 10 to 12 per cent Si | 109 | 1.55 |
| 25 to 30 per cent Si | 172 | 1.9 |
| 45 to 50 per cent Si | 333 | 2.9 |
| 70 to 80 per cent Si | 714 | 4.3 |
| 90 to 95 per cent Si | 1,000 | 6.4 |
| Ferromanganese: | | |
| 18 to 12 per cent Mn | 67 | 1.8 |
| 70 to 75 per cent Mn | 167 | 3.15 |
| Ferrochrome: | | |
| 10 per cent Cr | 286 | 2.9 |
| 1 per cent Cr | 555 | 4.05 |
| Ferrotungstens | 400 to 286 | 2.7 |

# PERSONAL

Donald M. Ryerson has returned to Joseph T. Ryerson & Son, Chicago, where he will continue as vice-president on purchases and sales. At the outbreak of the war, while waiting for his call to the Navy, Mr. Ryerson originated the idea of the Four-Minute Men, and established that organization with the National Government at Washington as a division of the Committee on Public Information. The Four-Minute Men grew to be the largest and most powerful speaking organization the world has ever known. At the close of hostilities there were over 75,000 active speakers in Government service. For a short time after graduating from the First Officers' Training School at Annapolis, Mr. Ryerson acted as instructor. Soon, however, he was transferred to active duty on the destroyer Sigourney, operating out of Brest, where he served first as lieutenant, J. G., and later as lieutenant, U. S. N., until he was released, shortly after the signing of the armistice.

DONALD M. RYERSON

Edwin E. Slick, who resigned recently as vice-president and general manager of the Midvale Steel & Ordnance Co., was given a dinner at the Johnstown Country Club by business associates and friends. He was presented a handsomely bound black leather book, containing a message of regret at his leaving the company, and the names of about 400 employees of the transportation department of the Cambria Steel Co., each man signing his own name.

Lieut. R. A. Fisher, U. S. N. R. F., for the past 18 months connected with the flying corps, has joined the sales and engineering force of the J. R. Stone Tool & Supply Co., Detroit. Lieutenant Fisher, before entering the service, was connected with the Curtis Aircraft Corporation and the Continental Motors Corporation, Detroit and Muskegon.

Duncan G. Sinclair, formerly chief assistant engineer of the Pittsburgh Railway Co., and the Duquesne Light Co., Pittsburgh, has been appointed New York manager for the Pittsburgh Piping & Equipment Co., Pittsburgh, which has opened an office in the St. Paul Building, 220 Broadway, New York.

Frank J. Herman, for several years connected with W. J. Rainey, and later with the Fuel Administration at Washington, has become associated with Pilling & Crane, Philadelphia and New York. He will be connected with their fuel department, dealing in all grades of coke and soft coal.

James Lloyd has been appointed general superintendent of the Lowellville plant of the Sharon Steel Hoop Co., Lowellville, Ohio. He succeeded J. E. Daily, who resigned recently because of ill health. W. B. Parry, mill superintendent at Lowellville, has been made assistant general superintendent of that plant.

To cater to those industries which do not maintain an engineering department the Pull-Man Engineering Service has been established, with offices at 50 Church Street, New York, and laboratories at Brooklyn. The work covers experimental work in electrical, mechanical, civil, chemical, hydraulic and efficiency engineering. The personnel comprises the following: Frank O. Price, for 12 years head of department of structural engineering, Pratt Institute, Brooklyn; Robert L. Lafferrander, instructor technical and industrial chemistry, Pratt Institute; Sterling W. Mudge, instructor in mechanical engineering, Pratt Institute; William N. Fenninger, educational director Brooklyn Edison Co.; Nicholas Heyman, instructor machine drafting, Pratt Institute.

Harry E. Barney, of the Laughlin-Barney Machinery Co., Union Arcade, Pittsburgh, has gone on a business trip to France and England.

D. M. Howell, formerly connected with the J. Lipsitz Co., scrap iron and steel dealer, at the New York and Chelsea, Mass., offices, has become a member of H. Cohen & Co., 105 Fifth Street, Chelsea, Mass., dealers in iron and steel scrap and metals.

George H. Simpson and B. H. Faulkner have been elected directors of the Central Foundry Co., succeeding B. F. Bush and F. C. Furlow, resigned.

Lieut. L. K. Goss, Ordnance Department, U. S. A., recently discharged, has become affiliated with the Manufacturers' Equipment Co., Waller Avenue and Fillmore Street, Chicago, as assistant to the president, Charles George. Before entering the service Mr. Goss was in the employ of the Warner & Swasey Co. as a western representative and manager of the small tool department. He is a graduate of Case School of Applied Science, Cleveland.

W. L. Wright, formerly vice-president and general manager, has been elected president of the Savage Arms Corporation, to succeed A. E. Borie, who recently resigned as president and was elected chairman of the board of directors. F. R. Phillips has been elected vice-president to succeed Mr. Wright. F. R. Pleasonton remains general works manager and Arthur F. Hebard has been appointed general sales manager. F. R. Schaefer remains sales manager of the products of the company manufactured at the Sharon, Pa., plant. These include frames, axles, transmissions and other parts for automobiles, motor trucks and tractors. The company will be represented in Detroit by Brockholst Mathewson.

W. A. Maxwell, formerly superintendent of the open-hearth department of the Homestead Works, Carnegie Steel Co., has resigned to become assistant general superintendent of the Cambria Steel Co., Johnstown, Pa., and H. A. Berg, formerly assistant superintendent of the Carrie blast furnaces, Carnegie Steel Co., has resigned to become general superintendent of the blast furnaces of the Cambria Steel Co.

H. L. Ritts, for some time sales engineer for Young Brothers, Detroit, has severed his connection with that concern to enter the employ of Holcroft & Co., contracting engineers, Detroit, in a similar capacity. Mr. Ritts will devote his attention to sales in the Middle States.

Lieut. Russell C. Gebert, recently released from the Ordnance Department of the Army, has been made chief metallurgist and superintendent of heat treating at the Hammond Steel Co., Syracuse, N. Y. Mr. Gebert has had technical education and wide practical experience.

George Charles and J. A. Buell have succeeded E. D. Rogers and E. H. Wells as directors of the United Alloy Steel Corporation.

Ernest W. Saunders has taken charge of the Hammond Steel Co.'s sales interests in the Cleveland field. The company expects to open an office in Cleveland.

At the meeting of the directors of the American Welding Society, April 11, J. H. Deppeler, of the Metal & Thermit Corporation, Jersey City, N. J., was elected a director of the society.

J. E. Malone, formerly in the Cleveland office of the Motch & Merryweather Machinery Co., has been transferred to the Cincinnati branch.

W. H. Taylor, president Iron Age Publishing Co., New York, has sailed on the Mauretania for England, and will spend a few weeks on the British Isles and in France.

R. E. McMath has been elected secretary of the Bethlehem Steel Co. and the Bethlehem Shipbuilding Corporation, Ltd. Mr. McMath, who was formerly assistant secretary of the same companies, succeeds the late Barry H. Jones.

J. V. Walsh has retired from the presidency of Mor-

ris Walsh Sons, barrel manufacturers, Pittsburgh, to devote his entire attention to the management of the Fiber Barrel Machinery & Mfg. Co., which is preparing to make high-pressure steam valves and continue its general line of machine work, as well as building machinery for the manufacturing of fiber barrels.

Clifford B. Connelley, dean of the School of Applied Industry, Carnegie School of Technology, Pittsburgh, has been granted an indefinite leave of absence, and has assumed his duties as State Commissioner of Labor Industries, with headquarters at Harrisburg, Pa.

The Niles Forge & Mfg. Co., Niles, Ohio, has opened a sales office at 1329 Schofield Building, Cleveland, with L. G. Young in charge.

Private William Goodlander, who was seriously wounded in the battle of the Argonne Forest, has recovered, and resumed his position in the sales department of the Republic Iron & Steel Co., in its Cincinnati office.

William Bischoff is resigning as assistant general superintendent of the Dominion Iron & Steel Co., Sydney, N. S., to accept a similar position with the Lukens Steel Co., Philadelphia.

Charles Mongana, for many years assistant chief engineer at the Ford Motor Co. plant and right hand man of C. Harold Wills, who was chief engineer of the company, has resigned to be associated with Mr. Wills.

Norman R. Seidle, plate work engineer, Joseph T. Ryerson & Son, Chicago, and in the service of the company for 14 years, has been appointed assistant general manager, James G. Heggie & Sons, Joliet, Ill., manufacturers of cylinders, ladles and tanks.

Robert Enos Adreon of St. Louis was elected president and general manager of the American Brake Co. at a recent meeting of the board of directors of the company.

A. S. Knowles has severed his connection with Freyn, Brassert & Co., engineers, Chicago, as consulting engineer in by-product coke oven matters.

T. J. Hudson of the Chicago Pneumatic Tool Co. has been appointed acting manager of the pneumatic tool sales division, effective April 15, succeeding F. H. Waldron, who returns to Minneapolis as district manager of sales for the Minneapolis territory.

Charles M. Schwab was elected president of the Pennsylvania Society at the annual meeting in New York, April 15.

J. B. Bartholomew, who has been identified with the structural steel sales department in New York of the Bethlehem Steel Co., has been made structural sales expert of the company's Boston office, 141 Milk Street, and sales engineer for the Bethlehem Steel Bridge Corporation.

B. R. Parrott, formerly designer and engineer for the One Wheel Truck Co. of St. Louis, and later sales manager of the National Tool & Mfg. Co., has been appointed sales manager of the Inland Machine Works, St. Louis, piston ring manufacturer.

P. F. Sheeran has resigned as treasurer of the J. J. McCabe Lathe & Machinery Corporation, Singer Building, New York, and has engaged in the new and second-hand machinery business for himself with an office in the Singer Building. Mr. Sheeran had been connected with the McCabe organization for 20 years, having started as stenographer for the late J. J. McCabe two decades ago. A few years ago he was elected secretary and about a year ago treasurer of the company. He had charge of sales and advertising for the McCabe company for many years.

J. I. Thompson, chief engineer, and A. W. Grant, Jr., gas engineer, of the H. Koppers Co., Pittsburgh, sailed for Europe last week on a business trip in the interest of the company.

E. A. S. Clarke, president Consolidated Steel Corporation, was scheduled to leave England on April 23 for his return to the United States.

S. H. Noon has been elected vice-president of the Standard Sanitary Mfg. Co., Pittsburgh, to succeed the late Francis J. Torrance. Mr. Noon, who has been secretary and treasurer of the company for some years, will retain the latter office, while M. C. Wilde, assistant secretary and treasurer, will act as secretary.

James L. Wick, Jr., special agent for the Youngstown Sheet & Tube Co., has resigned to become identified with the Falcon Bronze Co., in which he has obtained a financial interest. Gus A. Doeright is manager.

William R. Blackburn for 12 years with the Cadillac Motor Car Co., Detroit, has joined the Gray Motor Co., Detroit, and is in charge of production of the new Gray four-cylinder Victory engine.

Fred F. Fulton, formerly sales manager Inland Machine Works, St. Louis, has become connected in a similar capacity with the Ever Tight Piston Ring Co., St. Louis.

## OBITUARY

CHARLES BRINKERHOFF RICHARDS died April 20 at New Haven, Conn. He was born in Brooklyn, N. Y., Dec. 23, 1833, and was the inventor of the steam engine indicator known by his name. He was a co-worker with the late Charles T. Porter in developing the high-speed reciprocating steam engine and received from the French Government the badge of a chevalier of the Legion of Honor. He was for 25 years Higgins professor of mechanical engineering at Yale University and for the past nine years had emeritus rank. He was consulting engineer and assistant superintendent at the Colt's armory at Hartford, Conn., during the Civil War, and he was superintendent of the Southwark Foundry & Machine Co., Philadelphia, when called to the Sheffield Scientific School. He developed testing machines, was an authority on heating and ventilation, the consulting engineer for the State capitol at Hartford, a United States commissioner to the Paris Exposition in 1889, a fellow of the American Academy of Arts and Sciences, a founder of the American Society of Mechanical Engineers, and a member of other scientific bodies.

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JOHN T. DICKERSON, general manager Strauss Bascule Bridge Co., Chicago, died after a week's illness from pneumonia, April 14, at his home at Oak Park, Ill. He was born 40 years ago and was graduated in 1902 from Rose Polytechnic Institute, Terre Haute, Ind., as a civil engineer. He has occupied positions in the bridge departments of the C. B. & Q. and C. R. I. & P. railroads and the American Bridge Co., at St. Louis, as assistant engineer and general sales engineer Scherzer Rolling Lift Bridge Co., Chicago; and has been with the Strauss Bascule Bridge Co. for seven years. Mr. Dickerson belonged to the American Society of Civil Engineers and to the Engineers' Club of Chicago.

HOWARD ABBOTT, aged 58, consulting engineer attached to the chief of staff of the Ordnance Department, died April 16, in the Georgetown Hospital, Washington. He was also a member of the small tool division before entering the Ordnance Department. About a year ago he was connected with the Winchester Repeating Arms Co. At one time he resided in Pittsburgh, and while there was master mechanic for the Pittsburgh Screw & Bolt Co., and later was connected with the Westinghouse Electric & Mfg. Co.

SOREN SANNE JACOBSEN, member of Gannestad & Jacobsen, engineers, Pittsburgh, died at his home in Beaver, Pa., April 11, of pneumonia. He was born in Christiania, Norway, in 1868, and came to America as a young man and spent the greater part of his life in Pittsburgh, as a skilled blast furnace and rolling mill designer.

GEORGE D. SHERIFFS, president Sheriffs Mfg. Co., Milwaukee, manufacturer of propeller wheels and other marine castings, died Friday, April 18, after a long illness. He was born in Milwaukee in 1869. Mr. Sheriffs served as secretary of the Western Malleable & Gray Iron Co., Manitowoc, Wis.

## Electric, Open-Hearth and Converter Steel Castings Compared

A discussion of the advantages of the electric furnace in the steel foundry, particularly in comparison with the small open-hearth and the small converter, was presented at the recent convention in New York, April 4, of the American Electro-Chemical Society by W. E. Moore, president W. E. Moore & Co., engineers, Pittsburgh, in a paper "The Electric Furnace: Its Introduction Into Foundry Practice." After a general portrayal of the various operating and metallurgical advantages of the electric furnace, the author concluded his paper with the following comparison of the physicial properties of the three grades of steel and also with data as to costs.

Electric-furnace steel, when made to the same chemical specification, is always better than other steel. Usually such steel will run 15 per cent or better in tensile strength or in ductility, depending upon its heat treatment. It is easier to control the composition, and consequently, electric steel can be made to more accurate specifications than other steel.

The following comparative physical properties of electric furnace versus open-hearth steel made to the American Electric Railway "Axle Steel Specifications" is shown by the tests of a prominent metallurgical engineering firm for a large city street railroad line. These steels, after forging, were held one hour at a temperature of 1450 to 1460 deg. Fahr. (785-793 deg. C.), then quenched in 65 deg. oil, then drawn back at 1185 deg. Fahr. (640 deg C.) and cooled slowly in the furnace.

| | A. E. R. A. Standard Specifications | Open-Hearth | Electric Steel |
|---|---|---|---|
| Elastic limit (lb. per sq. in.) | 55,000 | 41,060 | 64,850 |
| Yield point (lb. per sq. in.) | .... | 41,060 | 64,850 |
| Tens. strength (lb. per sq. in.) | 90,000 | 89,100 | 105,140 |
| Elongation in 2 in. (per cent) | 22 | 21.5 | 22.0 |
| Reduction in area (per cent) | 45 | 31.74 | 52.37 |
| Character of fracture | .... | .... | silky cup |
| Elastic torsion | .... | 16,750 | 33,700 |
| Shearing strength | .... | 62,400 | 76,000 |

The following is the estimate of operating cost per ton of liquid steel, produced by Pittsburgh 3-ton type electric foundry furnace, in continuous operation, melting heavy steel turnings and superheating the steel to a fluidity suitable for small steel castings:

| | |
|---|---|
| *Melting Stock.* | |
| 1 ton heavy steel turnings—axle turnings | $12.00 |
| 1/20 ton (5 per cent) loss in melting axle turnings | 0.60 |
| Electric power, 550 k.w.h., @ 1c | 5.50 |
| Electrodes, carbon, 20 lb., @ 9c. (ante bellum price 4½c.) | 1.80 |
| 33 lb. of mill scale (used as a decarbonizer) | 0.09 |
| *Additions.* | |
| 8 lb. 70 per cent ferromanganese @ 10c | 0.80 |
| 5 lb. ferrosilicon @ 5c | 0.50 |
| (Note that spiegel and 20 per cent ferrosilicon may be substituted at lower cost.) | |
| ½ lb. aluminum | 0.17 |
| *Labor and Maintenance.* | |
| Wear and tear on refractory roofs and linings @ 40c. per ton (some of our users average 20c. per ton) | 0.40 |
| Furnace labor | 1.00 |
| Total cost of liquid steel in the ladle (per ton) | $22.86 |

## Greaves-Etchells Electric Furnaces

The Electric Furnace Construction Co., Philadelphia, reports the successful starting up of a Greaves-Etchells furnace at the plant of the Davidson Tool Mfg. Corp., Brooklyn. This furnace is used in conjunction with Mr. Davidson's special process for the manufacture of high speed cast steel tools. A 6-ton furnace has also been started at the Navy Department, Mare Island.

The company also reports the successful starting of a special Greaves-Etchells type of furnace for the manufacture of corundum at the works of the William W. McGregor Co., Airdrie. The material used for the charge is the waste dust accumulated from the crushing of natural corundum. This was practically useless and was generally considered to be a waste product. A charge of 7 tons of this material was treated in approximately 8 hr. The total energy consumption was 3850 units, and the usable corundum ingots weighed nearly 4 tons. Results of the tests made gave great satisfaction and promise a new field for the electric furnace. It is understood that fairly constant load was obtained throughout the whole of the operation.

In England Greaves-Etchells furnaces have been started up for the Tyne Electric Steel Foundries, Ltd., for the manufacture of steel castings, and a special 6-ton furnace for W. W. McGregor, of Airdrie, for the manufacture of alundum.

## Test of Colloidal Fuel

Colloidal fuel, composed of pulverized coal in suspension in oil, was discussed in the issue of March 27. The result of a trial run, giving a comparison with a similar one of Mexican topped oil, has been obtained from Lindon W. Bates, 141 Broadway, New York. The actual and equivalent evaporations per gallon are as follows:

| | Actual Evaporation per Gallon, Lb | Equivalent Evaporation per Gallon, Lb |
|---|---|---|
| Colloidal grade No. 13 | 106 | 121.5 |
| Mexican topped oil | 96.5 | 111.5 |
| Difference in favor of colloidal fuel | 9.5 | 10.0 |

This means, it is pointed out, that the steaming radius of a ship or locomotive would be 9 per cent greater with the same volume or tankage, if the colloidal fuel be used as against the oil.

The comparative tests are as follows:

*Comparative Tests of Colloidal Fuel Grade No. 13 and Mexican Oil*

| | Colloidal No. 13 | Mexican |
|---|---|---|
| Test No. | 6 | 1 |
| Day of March, 1919 | 24 | 7 |
| Total evaporation per hr., lb. | 15,336 | .... |
| Length of test, hr. | 8 | 8 |
| Quality of steam, per cent | 97.2 | 97.3 |
| Actual evap. per hr., lb. | 14,907 | .... |
| Factor of evaporation | 1.173 | .... |
| Equivalent evap. per hr., lb. | 17,486 | 16,200 |
| Fuel as fired, lb. per hr. | 1,286 | 1,159.5 |
| Actual evap. per lb. fuel, lb. | 11.6 | 12.06 |
| Equiv. evap. per lb. fuel, lb. | 13.6 | 13.97 |
| Boiler hp. developed | 507 | 481.96 |
| Per cent rated capacity | 126 | 119.6 |
| Efficiency, per cent (B.t.u. 17,200) | 76.8 | |
| Efficiency, per cent (B.t.u. 18,482) | | 73.3 |

The Bureau of Yards and Docks, Navy Department, Washington, proposes to proceed with the construction of the steel works and armor plate plant for the Government to be located at Charleston, W. Va., and preliminary erection of which has been inaugurated. The plant is estimated to cost in excess of $2,000,000, and will consist of open-hearth and heat treating works, forge and furnace shops and machine shops. The structures will be 220 x 520 ft., 100 x 400 ft., 400 x 700 ft., and 320 x 700 ft.

The Industrial Steel Castings Co. has been incorporated with a capital of $100,000, and has taken over the plant of the former Taylor Coupler & Castings Co. at Toledo, Ohio. The new concern expects to start the manufacture of steel castings about June 1, and will have an estimated capacity of about 2500 tons per year. Electric furnaces are now being installed in the plant.

The Faultless Anchor & Mfg. Co. has leased temporary quarters in Centerburg, Ohio, and will manufacture telephone poles, guy anchors and mop-sticks, and will also operate a machine shop for repair work. This company has purchased a site on the Pennsylvania Railroad, upon which it expects to erect a building suitable for its business.

The Semet-Solvay Co., Solvay, near Syracuse, N. Y., has suspended operations at its coke works at Benwood, W. Va., to make extensive repairs and improvements in the plant. The plant has been operating continuously for three years past, giving employment to about 150 men.

## Book Reviews

**Metal Statistics, 1919.** Pages 447, 4 x 6 in. Published by the American Metal Market and Daily Iron and Steel Report, New York. Price 50 cents.

This statistical handbook of iron and steel and non-ferrous metals has now reached its twelfth annual edition, each year adding to its size and prestige. The editors, C. S. J. Trench and B. E. V. Luty, refer to the interest taken in what occurs in prices and production during and after wars as the reason for lengthening many of the tables in point of time. The pig iron price tables, for example, go back to the eighteenth century. Another addition in the present volume is the printing of iron and steel rail prices for early years in the period preceding that in which billets were taken as the representative form of steel. The billet tables begin in 1890 and the rail tables in the case of iron rails cover the period 1847-1882 and for steel rails yearly average prices are given in the period 1870-1890. It would be well, in view of the interest taken in rail prices since the Government assumed control of the railroads, to give a table of rail prices down to the present. All the tables of iron and steel products are of special interest in the past two years as showing the important reduction which became effective October, 1917, under agreement with the Government, and the transition reduction under open quotations on Dec. 13, 1918. The composite price of finished steel products is given for each year beginning with 1897. The groups taken for this price consist of bars, plates, shapes, pipe, wire nails, sheets and tin plates. Each group is weighted according to its tonnage importance, bars being given 2½ lb., plates, shapes, pipe and wire nails 1½ lb. each, sheets 1 lb. and tin plates ½ lb. in a 10-lb. total. The weightings date back to 1897. In the interval some change has taken place in the relative tonnage importance of these products. Probably in no year since it was established has this statistical volume been put to everyday use to the extent it is likely to be referred to in this transition year.

**Inventor's Manual.** By George M. Hopkins. Pages, vii + 144, 5 x 7½ in.; six illustrations. Published by the Norman W. Henley Publishing Co., 2 West Forty-fifth Street, New York. Price, $1.25.

This is the second edition of this book, originally written by George M. Hopkins, a scientist and patent attorney, first copyrighted in 1889, and now revised by A. A. Hopkins, a member of the American Statistical Association. The book is intended as a guide for inventors in perfecting their inventions, taking out their patents, and disposing of them to the best advantage.

The first 78 pages include a discussion of the kinds of patents that are profitable, information on drawing up the patent, and an explanation of the necessity of consulting the right kind of lawyer. The correct procedure in the development of the invention is pointed out, sample forms for assigning an interest in the patent are given, and the relations of the inventor and promoter are explained. A number of pages are devoted to design patents and registration of prints and labels.

The numerous pitfalls set by unscrupulous attorneys are quite thoroughly discussed. This information as well as that on the marketing of the patent is of special value to the inexperienced inventor.

The remaining pages are devoted to the census of 1910 arranged according to occupations, also a census of the larger cities and of states by counties. Six reproductions of patent office drawings are included.

**Mining Engineers' Handbook.** Edited by Robert Peele. Pages 2375, 7¼ x 5 in. Published by John Wiley & Sons, New York. Price $5.

This is a volume of 2307 pages and index. The large number of subjects dealt with is shown by an index of 66 pages. The volume is attractively bound in red leather. Besides the sections dealing with mineralogy, ore deposits, methods of prospecting, exploration and mining, and mining plants of all kinds, there are others on certain branches of civil, electrical and mechanical engineering. Mr. Peele has recognized that the mining engineer in equipping and operating mines has to deal with many branches of engineering and he has, therefore, included data that would otherwise be unnecessary. A large number of specialists have contributed sections. There are 44 sections in the book.

**Sulphuric Acid Handbook.** By Thomas J. Sullivan. Pages 240, 7¼ x 5 in. Published by the McGraw-Hill Book Co., Inc., New York. Price $2.50.

This is an up-to-date handbook of numerical data on sulphuric acid. It deals with the subject from the gaging of the volume in vertical or bumped horizontal cylindrical tanks right through the laboratory gravity and temperature determinations and calculations and concludes with information on iron and lead acid-proof pipes and fittings. Most of the data on the manufacture of acid, on sulphur, sulphur dioxide gas, nitric and nitrous acid, arsenic, selenium, etc., are sufficiently covered for practical application in the plant. Chemists having anything to do with the mineral acids will find their requirements taken care of. The regular standard tables covering hydrometer scales and acid gravities are given.

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The committee on education and special training of the War Department, Mills Building, Washington, has issued an advance edition of its instruction manual No. 8 for machinists. It is issued in the form of loose-leaflets in stiff paper binder, and is divided into two parts: Part I, ten pages of general information, analyses of the duties of machinists in the army and the degree of skill required; part II, seven pages descriptive of training methods, and a classification of job sheets for training on various shop equipment. Of these, 83 are enumerated; 27 on general tools and operation, 19 on the lathe, eight on the drill press, seven on the shaper, four on the planer, 11 on the milling machine, and seven on the grinding machine. Only 38 of these job sheets are included in the advance edition. The manual is based on these job sheets, which consist of a series of pertinent questions designed to direct the apprentice's line of thought to the fundamentals of the work, and they are intended to supplement the more important training carried out by actual shop work under supervision.

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The Bureau of Standards has sent to the printer technologic paper No. 109 on "Conservation of Tin in Bearing Metals, Bronzes and Solders." The authors are Dr. G. K. Burgess and R. W. Woodward. This paper gives practical suggestions for the conservation of tin in bearing metals, bronzes, and solders; much of the data having been obtained from questionnaires sent to representative manufacturers and users of the above-named alloys. Tables are given showing the chemical composition and physical properties of many of the suggested alloys and also for service tests of genuine Babbitt and a high lead bearing metal. Tentative recommendations for standard grades of bearing metal are also included. Proper solders for various industrial uses are recommended and a new solder consisting of a preponderance of lead with small amounts of tin and cadmium is desired.

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"The Right Man in the Right Place in the Army" is the title of a 38-page pamphlet issued by the adjutant-general's department, committee on classification of personnel in the Army, Washington, D. C. Those who prepared it feel that the same methods should be appropriate and applicable for personnel departments of civilian industries. There are 32 plates illustrating "the raw material," and included are methods of classifying; the file system for keeping complete record of qualifications; the tests for selecting tradesmen, and steps in the making of a trade test.

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The proceedings of the National Safety Council, at its seventh annual congress, Sept. 16-19, 1918, at St. Louis, are now available in a volume 6 x 9 in., 1246 pages, which has been issued from the office of the council, Continental and Commercial Bank Building, Chicago, price $5.

# Machinery Markets and News of the Works

## NEW PLAN FOR TOOL SALES

### Dealers' Proposal to War Department

#### Commission of 7½ Per Cent Offered by Director of Sales Held to Be Inadequate—Tool Builders Also Dissatisfied

As a result of a recent conference in Washington between representatives of the National Supply and Machinery Dealers' Association and officials of the office of director of sales of the War Department a plan has been drawn up by a committee of the machine-tool dealers for the disposal of Government-owned second-hand tools. This plan will soon be submitted to the Government officials as a substitute for the Government proposal, which the dealers regard as unacceptable because the compensation offered is only 7½ per cent. Under the plan to be proposed by the dealers, the Government is asked to pay a total of 15 per cent.

While the machine-tool dealers say they are not attempting to dictate to the Government what it shall pay, it is stated unofficially by some of the dealers that nothing less than a 15 per cent commission will be accepted. The plan is to divide the country into 25 selling districts, these districts to be the ones generally recognized by machine-tool builders in their selling arrangements with dealers. A dealer would be appointed in each district to be solely responsible to the War Department for all sales in his district, his compensation to be 2½ per cent on gross sales. He is to have the right to enlist the co-operation of other dealers in his district, the idea being, so far as possible, to sell various makes of tools through the distributer who handles new tools of the same make. The commission to be paid to these other dealers, as proposed, is 12½ per cent. The Government is asked to furnish warehouse space free until the tools are disposed of.

The committee in charge of the arrangements is headed by George H. Cherrington, president Brown & Zortman Machinery Co., Pittsburgh, other members being W. J. Radcliffe, E. A. Kinsey Co., Cincinnati, and J. W. Wright, Colcord-Wright Machinery & Supply Co., St. Louis. A special committee on the disposal of Government tools consists of M. A. Sherritt, Sherritt & Stoer Co., Philadelphia; H. W. Strong, Strong, Carlisle & Hammond Co., Cleveland, and Thomas A. Fernley, secretary-treasurer National Supply and Machinery Dealers' Association, Philadelphia.

Disposal of all new tools which were bought by the War Department and not used is to be arranged, if possible, through the machine-tool builders, each builder being asked by the Government to take back and re-sell his own tools on a 7½ per cent commission. Some of the builders, however, object to the commission as inadequate, especially as they pay their distributers 10 per cent or more on all sales. Unless the dealers would be willing to make special arrangements, the builders would be obliged to pay a larger commission for re-selling the Government tools than the Government's commission.

The Division of Military Railways will dispose of between $3,000,000 and $4,000,000 worth of locomotive cranes, which were bought for service in France, to the Railroad Administration. The prices which the railroads will pay has not been made public.

Machine-tool business is extremely quiet in the East, though Chicago, Milwaukee, Detroit and Cleveland report fairly good business. However, the report comes from Cincinnati that the present rate of production in machine-tool plants there cannot long be maintained unless new business grows to larger proportions. In Chicago, buying of tools covers a wide range of industries. The Bucyrus Co., South Milwaukee, Wis., will soon buy a list of tools for which it inquired a few weeks ago. Selections of tools required by the Studebaker Corporation, South Bend, Ind., will be made at Detroit, but orders will be placed at South Bend.

In the Cleveland market, orders come principally from the automobile and tractor industries. One dealer last week received an order for 30 machines and another sold 16 small lathes and four boring mills. The Jones Gear Co., Cleveland, has bought $50,000 worth of gear-generating machines for a new plant.

Some of the Cincinnati machine-tool builders who have made reductions in prices declare that these are the last that will be made this year. A few of the machine-tool builders who were guaranteeing prices against decline have discontinued this practice.

## New York

NEW YORK, April 22.

Differences between the office of the director of sales of the War Department and the machine-tool trade over the question of compensation for disposal of Government-owned tools, both new and used, have not yet been adjusted. Both machine-tool builders and dealers are dissatisfied with the proposal of the War Department to give 7½ per cent commission, and in the case of the dealers it is stated that nothing less than 15 per cent will be acceptable.

As a result of the recent conference in Washington between the National Supply and Machinery Dealers' Association and officials of the director of sales office of the War Department, a proposal will be made by the machine-tool dealers that the country be divided into 25 districts, and that one dealer be appointed in each district who shall be solely responsible to the Government for the sale of second-hand tools owned by the Government in his district. This Government agent shall have the right to enlist the co-operation of other dealers in his district, and the plan is to have the various dealers distribute their own regular lines so far as possible. The district agent, according to the proposed plan, shall be paid 2½ per cent on the gross sales in his district, but every dealer shall receive 12½ per cent of his sales. Thus the Government would pay a total of 15 per cent for the disposal of its second-hand tools. It is stated on behalf of the machinery dealers that nothing less than this amount will be acceptable, and the situation is said to be such that if the Government does not choose to accept this proposal it will not have the co-operation of the machinery dealers in the sale of its used tools.

All new tools are to be turned back to the manufacturers who made them, and are to be resold at the present

selling prices for such tools. One Government tool is to be sold for every tool sold from the manufacturer's own stock. Machine-tool builders are said to be unwilling to accept this plan unless there is greater compensation, the 7½ per cent which the Government offers being unacceptable to many. It is pointed out that unless machine-tool dealers having exclusive selling rights for certain tools should agree to waive their agreements the tool builders would be obliged to pay them more for the sale of these tools than they would receive from the Government, commissions on sales of new tools from the factories being in most cases 10 per cent, and sometimes up to 15 per cent.

Meanwhile, the director of sales office is completing its inventories of machine tools and is arranging for an organization of machine-tool men to handle sales. Prices on second-hand tools will be fixed by appraisal, and it is understood that the efforts of the Government will be directed toward getting full value for used equipment. Many prospective buyers of tools have been holding off in the hope that they would be able to pick up "bargains" from the Government stocks, but it seems questionable whether these tools will be disposed of at sacrifice prices.

Few orders for tools are being placed in the New York market, but inquiries continue in fair volume. Machine-tool sellers never had so many inquiries pending, and purchases which it was expected would be made by this time have been repeatedly postponed. It is admitted in the trade that nearly all prospective purchasers are looking for lower prices. Some of the machine-tool builders have a very satisfactory volume of business on their books, while others are in need of orders. In most cases, operations are being fairly well maintained, though not a few plants are putting a great many machines in stock. One large company has several hundred small and medium-sized tools ready for immediate shipment.

The E. W. Bliss Co., Brooklyn, is buying new equipment, having purchased two large tools last week totaling about $50,000. The Sprague Electric Works of the General Electric Co., Bloomfield, N. J., is buying about 15 tools. Other buying of the past week has been mainly single tools.

Crane business is in very small volume, though crane builders are figuring on many inquiries. The only order of note placed recently was a 100-ton power-house crane sold by the Cleveland Crane & Engineering Co. to Sanderson & Porter, New York.

The assets of the Massachusetts Copper Casting Co., 171 Van Brunt Street, Brooklyn, N. Y., bankrupt, will be sold at auction April 28, by James Gray, trustee. The property to be sold will incude machinery, motors, furnaces, etc.

During the past 24 months the Booth Felt Co., 463 Nineteenth Street, Brooklyn, has manufactured about 2,000,000,000 washers for the Government, covering washers for fuse parts of high-explosive shells and for Liberty motors, as well as automobile trucks; over 600,000 fuse-box strips were also produced for the Army. The company has now reverted to pre-war operations at its works, devoting production to the manufacture of washers for machinery, typewriters, electrical equipment, etc.

Randall & Biddulph, Inc., New York, has been incorporated with a capital of $10,000 by C. C. Randall, H. Biddulph and B. Epstein, 799 Greenwich Street, to manufacture rotogravure machinery.

The Multi Vane Construction Co., New York, has been incorporated with a capital of $150,000 by F. A. Sawyer, J. Immerman and A. H. Jackson, 2 Rector Street, to manufacture aeroplanes and aircraft parts.

The Wander Iron Works, 321 East Ninety-fourth Street, New York, has purchased property 35 x 137 ft., on Whitlock Avenue, near 144th Street, and plans a new one-story brick shop, 35 x 135 ft., for works expansion. Samuel Wander is president.

The Silsbe-Du Temple Motors Corporation, Brooklyn, has been incorporated with a capital of $100,000 by H. Wiesmann, M. Hertz and S. F. Burkard, 44 Court Street, to manufacture motors, parts, etc.

The new works building of the Orteig Motor Co., 101 West End Avenue, New York, now in course of erection at 231-47 West Sixty-first Street, will be occupied by a number of automobile companies for service operations. The Orteig company will utiize the entire fourth floor; the King Motor Car Co., 50 Union Square, the first floor; the Franklin Motor Car Co., 1830 Broadway, the second floor; and other space by the Walters Motor Truck Co.

The Riverside Steel Casting Co., Passaic Avenue, Kearny, N. J., has purchased about 5 acres at 326-44 Riverside Avenue, Newark, as a site for a new works. The initial plant is estimated to cost about $200,000, and will consist of a number of one and two-story concrete buildings for foundry and machine work. The company plans to remove its present works to the new location, giving employment to a total of close to 1000 men.

In connection with the new plant of the American Oil & Supply Co., Lafayette Street, Newark, N. J., to be located on Wilson Avenue, a one-story brick power plant, 40 x 50 ft., will be erected for works operations. It will be provided with coal bunkers. The entire oil works will cost about $75,000. The Charles R. Hedden Co., 763 Broad Street, Newark, is the building contractor.

The Electric Motor & Repair Co., 264 Halsey Street, Newark, N. J., will build a one-story extension, about 37 x 55 ft.

The Iron Bound Box Co., 169-171 Chestnut Street, Newark, N. J., has filed notice of organization. T. Marano, 120 Bergen Street, Harrison, heads the company.

The Standard Stove Works, Perth Amboy, N. J., have been incorporated with a capital of $100,000 by Harris Edelstein, H. and J. Greenspan, to manufacture stoves.

The Organic Salt & Acid Co., 61 Nott Avenue, Long Island City, N. Y., has purchased the plant of the Maas & Waldstein Co., Avenue R, Newark, N. J., for a consideration said to be about $450,000. It aggregates about 16 acres.

The M. W. Kellog Co., 117 West Side Avenue, Jersey City, N. J., manufacturer of riveted steel pipe, etc., is negotiating with the City Commisssion for the purchase of about 40 acres in Droyer's Point section, as a site for a new plant. The proposed works are estimated to cost about $2,000,000, and will be designed to give employment to about 2000 men.

The former property of the T. A. Gillespie Co., Runyon, near Perth Amboy, N. J., operated as a shell-loading plant, and recently purchased by realty interests, will be offered at auction on May 6, divided into several parcels. The property consists of electric power plant, shell-loading works, machine shops, wood-working plant, and other structures, together with machinery and equipment.

The Bureau of Yards and Docks, Navy Department, Washington, is planning the construction of a new pumping plant at Rockaway, Long Island.

The Louraine Magneto Co., Long Island City, N. Y., recently organized to manufacture ignition products, has had plans prepared for a three-story brick and steel plant, about 100 x 150 ft., on Thirteenth Avenue, near Van Alst Avenue, estimated to cost $40,000. The company has a temporary address at the office of the Roman Callman Co., Bridge Plaza, Long Island City.

The Steel Barrel Co. of New York, Brooklyn, has been incorporated with a capital of $5,000 by F. C. Pringle, J. J. and J. P. McManus, 25 William Street, to manufacture metal barrels.

In connection with its removal to 240 West Fifty-ninth Street, the New York Fulton Truck Co., New York, will increase its service station and repair department. W. I. Fickling is head of the local organization.

The O. J. Maigne Co., 358 Pearl Street, New York, manufacturer of printers' rollers, etc., has had plans prepared for rebuilding its three-story and basement plant at Hutchinson and Chandler streets, Philadelphia, 45 x 85 ft., to cost $12,000.

The Hammond & Carpenter Corporation, New York, has been incorporated with a capital of $200,000 by C. A. Cole, H. A. Bingham and A. R. Oakley, Pearl River, N. Y., to manufacture vaporizing equipment.

Property of the Wolf Safety Lamp Co. of America, DeKalb and Grand avenues, Brooklyn, will be sold by Francis P. Garvan, Alien Property Custodian, on May 1.

The Contra-Pole Electric Co., Brooklyn, has been incorporated with a capital of $100,000 by S. Mandell, S. T. Siegel and M. Greenberg, 165 Broadway, New York, to manufacture electrical apparatus.

The Independent Motor Wheel Co., New York, has been incorporated with a capital of $100,000 by W. H. Lounsberry, Mount Vernon, N. Y.; W. Klingberg and W. Carl, 1804 Avenue C, Brooklyn, to manufacture automobile wheels.

J. J. Tighe, 160 Twenty-fifth Street, Brooklyn, will build a one-story addition, 90 x 100 ft., to his brass foundry, to cost about $30,000.

The Estey-Trainor Wire Cloth Co., Brooklyn, has been incorporated with a capital of $10,000 by E. J. Trainor, G. H. and S. R. Estey, 270 Union Avenue, to manufacture wire goods.

The Romaro Machine & Tool Co., New York, has been incorporated with a capital of $10,000 by T. H. Ross and H. Marcus, 1596 President Street, Brooklyn, to manufacture tool specialties and machinery.

The American Can Co., 120 Broadway, New York, is reported considering the erection of a one-story reinforced-

concrete addition to its plant at Fairport, N. Y., 32 x 75 ft.

The Lazal Motor Corporation, 87 West End Avenue, New York, has increased its capital from $25,000 to $50,000.

The Weleede Mfg. Co., Brooklyn, has been incorporated with a capital of $25,000 by J. Farber and C. Minoff, 1666 Stephens Street, to manufacture fiber products.

The International Conduit Corporation, New York, has been incorporated with a capital of $300,000 by C. J. Schumacher, E. W. Diedler and F. A. Coxe, 18 Broadway, to manufacture electrical and other conduits.

Electrical and steam equipment, transmission machinery, and other operating equipment, will be intalled in the 11-story brick and concrete addition to be erected at the works of D. Auerbach & Sons, 638 Eleventh Avenue, New York, manufacturers of confectionery. The structure will be about 100 x 200 ft., located at West Forty-sixth Street, corner of Eleventh Avenue.

The American Safety Razor Corporation, 303 Jay Street, New York, is having revised plans prepared for an addition and alterations in the existing plant.

The Grand General Machine & Brass Works, Inc., New York, has been incorporated with a capital of $10,000 by B. Friedman, I. Gisser and S. Dressler, 104 Second Street.

The Puritan Mfg. Corporation, Brooklyn, has been incorporated with a capital of $100,000 by G. Marsico and A. Trubiano, 141 Montrose Avenue, to manufacture automobile horns and warning signals.

The Automatic Featuring Machinery Co., New York, has been incorporated with a capital of $400,000 by G. W. Brown, O. P. Carpenter and G. A. Williams, 154 Nassau Street, to manufacture motion picture machines and parts.

The Gas Engine & Power Co., Morris Heights, N. Y., has filed notice of change of its name to Charles L. Seabury & Co., Consolidated.

The Kopp Arrow Garage Co., 330 Utica Avenue, Brooklyn, is planning for the rebuilding of its five-story works building at Liberty and Watkins avenues, to cost about $10,000.

The North Jersey Foundry Co., Paterson, N. J., has been incorporated with a capital of $25,000 by Henry A. Breeland and Joseph T. Smith.

The Hudson Surgical Co., 10 Bergenline Avenue, Union Hill, N. J., has filed notice of organization to manufacture surgical instruments. William E. Friedenberg heads the company.

The Capitol City Plating Co., Tivoli Street, Albany, N. Y., is considering the erection of a one-story iron-working shop, 80 x 80 ft., adjoining its works, to cost $20,000.

The Utica Electrical Appliance Co., Utica, N. Y., has been incorporated with a capital of $50,000 by M. A. Owens, L. J. Horrigan and A. C. Victory.

The Rex Machine & Tool Co., Newark, N. J., has been incorporated with a capital of $50,000 by Harry Charmony, M. Rumshinsky and Jacob Zuckerman.

The Lewis-Vought Aeroplane Co. is to locate a factory in Binghamton, N. Y., and will employ about 80 skilled workmen.

The 1900 Washer Co., Binghamton, N. Y., is doubling the capacity of its plant, which will be completely electrified by the Binghamton Light, Heat & Power Co. The present capacity of the plant is 100 washing machines per day.

The Precision Tool Co., 207 Market Street, Newark, N. J., recently incorporated, will act as selling agent for time and labor-saving production tools and for precision mechanical testing tools, not to manufacture them, as has been previously stated.

Joseph N. Courtade & Sons., Inc., 516 West Twenty-fourth Street, New York, manufacturer of piano cases, etc., is planning a six-story, reinforced-concrete plant on Jackson Avenue, Long Island City, 110 x 210 ft. It is proposed to develop the site as a main works.

The Feumort Mfg. Co., New York, has been incorporated with a capital of $50,000 by H. R. C. Sails, M. Saks and L. H. Minkoff, 1660 Union Street, Brooklyn, to manufacture fire extinguishers and apparatus.

The Cambria Metal Products Corporation, New York, has been incorporated with a capital of $15,000 by J. H. Wilhelm, A. W. Kurz and J. C. L. Rogge, 225 Fifth Avenue, to manufacture metal goods.

The American Machinery Exchange, 217 Centre Street, New York, has increased its capital from $10,000 to $75,000.

The Chevrolet Motor Co., 112 East Fifty-seventh Street, New York, has awarded a contract to the White Fireproof Construction Co., 286 Fifth Avenue, for the erection of its three-story and basement plant, about 80 x 220 ft., at Tarrytown, N. Y., to cost about $500,000.

The Myers Phonograph Corporation, New York, has been incorporated with a capital of $500,000 by F. Myers, P. L. Hughes and G. A. Handley, 600 West 175th Street, to manufacture talking machines.

The Benxer Corporation, Brooklyn, has been incorporated with a capital of $20,000 by L. and H. Benxer, and S. Kaplan, 53 Pineapple Street, to manufacture auto lamps, windshields, etc.

## Buffalo

BUFFALO, April 17.

The Buffalo Foundry & Machine Co., Buffalo, Henry D. Miles, president, is having plans prepared for a one-story brick addition, to be made this summer.

The Empire Axle Co., Dunkirk, N. Y., has been incorporated with a capital stock of $400,000 by C. J. Parker, H. E. Newell and H. J. Crane of Syracuse, N. Y., to manufacture axles, etc.

The Geneva Cutlery Co., Geneva, N. Y., H. H. Henry president, is having plans drawn for an additional plant building, 50 x 250 ft., three stories, of brick, to cost $100,000.

The Hudson Valley Foundry Co., Kingston, N. Y., has been incorporated by J. J. and D. J. Murphy and W. A. Roedell.

The Corning Glass Works, Corning, N. Y., is completing plans for a power house, 60 x 195 ft., one story.

The St. Lawrence Transmission Co., Potsdam, N. Y., has increased its capital stock from $525,000 to $3,000,000 for extension purposes.

The Sterling Aluminum Co., Erie, Pa., is soon to take bids for a factory, 40 x 160 ft., two stories, estimated cost $60,000.

The Jamestown Die & Tool Corporation, Jamestown, N. Y., has been incorporated with a capital of $100,000 by N. A. Johnson, R. B. Christofferson and W. B. Look.

The Sadler Cutlery Co., Hancock, N. Y., has been incorporated with a capital of $45,000 by T. Sadler, R. W. Bartles and F. Fuhrer, Middletown.

Contract for a new machine department, to cost about $30,000, has been awarded by the Douglas Packing Co., 6 North Main Street, Fairport, N. Y., to William Summerhays & Son, Exchange Street, Rochester, N. Y.

The tractor business of the Chase Motor Truck Co., South West Street, Syracuse, N. Y., has been acquired by Cluff Brothers, Toronto, Ont., manufacturers of brass goods, plumbing specialties, etc. The new owners will establish a works at Toronto for the manufacture of the tractor and will abandon production at Syracuse. It is the intention to dispose of the machinery and equipment at the Syracuse plant locally, purchasing new machinery for the proposed works at Toronto. It is planned to commence active production at the Canadian plant so that the new tractor may be marketed by early fall. R. J. Cluff and F. R. Bartlett head the company; Carlton A. Chase heads the Chase Company at Syracuse. M. E. Forbes will be general manager of the new tractor branch of the Cluff business; the company will be known as the Chase Tractor Co., Ltd.

The Canfield Machine Shop & Garage, 212 Grape Street, Syracuse, N. Y., is devoting a considerable portion of production to patented piston rings. They operate under an oil seal principle.

The Pressure Products Co., Silver Creek, N. Y., has been incorporated with a capital of $20,000 by T. Stewart, J. W. and M. J. Black, to manufacture dies, castings, etc.

The Link Piano Co., 183 Water Street, Binghamton, N. Y., manufacturer of electric pianos, has increased its capital from $75,000 to $105,000.

## New England

BOSTON, April 21.

The Warren Steam Pump Co., Warren, Mass., has started the erection of an addition to its factory consisting of one story, 85 x 200 ft.; addition to boiler house, one story, 40 x 60 ft., another story to be added to office building, etc.

The oxygen and acetylene buildings are under construction at Boston, Mass., for the Air Reduction Sales Co., New York. They are of reinforced concrete, 21 ft. high, and 50 x 100 ft., 40 x 60 ft., and 20 x 40 ft. The cost is $110,000.

The Cortz Mfg. Co., Holyoke, Mass., has awarded some contracts for the additions, brick and steel, $60,000, to a manufacturing building, one story, 21 x 22 ft., and to power house, one story, 12 x 30 ft.

Steam heating contract is not yet awarded, but other bids are now being considered for the erection of a manufacturing building, two stories, 51 x 100 ft., $25,000, for Kalasian Brothers, Inc., Worcester, Mass.

R. H. Taber, Wallingford, Conn., has let the general

contract for a factory building, one story, 30 x 56 ft., but will soon invite bidding on steam heating equipment, etc.

Erection of the addition to the machine shop has commenced at the Portsmouth, N. H., Navy Yard.

Two factory buildings, one story, 30 x 90 ft., and 40 x 40 ft., have been contracted for by R. Wallace & Sons, Wallingford, Conn.

Older & Rosenberg, Hartford, Conn., have begun the erection of a garage, brick, $80,000, four stories, 64 x 91 x 128 ft.

The Bridgeport Metal Goods Mfg. Co., Bridgeport, Conn., has increased its capital from $200,000 to $600,000.

The Hemming Brothers Co., New Haven, Conn., manufacturer of machinery, has awarded a contract to the Larkin-Carey Co. for the construction of the proposed one-story addition to its plant, 50 x 140 ft., to be located on River Street. C. H. Hemming is president.

The American Duplex Signal Co., Bridgeport, Conn., has been incorporated with a capital of $10,000 by Andrew Simon, George H. Wood and Frank Pekar, to manufacture automobile signals and signal devices.

The Fiskdale Auger & Bit Mfg. Co., Fiskdale, Mass., manufacturer of ship augers, brace bits, ship car bits, etc., has arranged for the removal of its works at East Brimfield to the main plant at Fiskdale. The East Brimfield plant has been giving employment to about 50 persons, and it is planned to continue with this same number, following the installation of the machinery and equipment at the Fiskdale works.

The Chase Metal Works, Thomaston Avenue, Waterbury, Conn., has filed plans for the erection of a one-story addition to its plant.

The Rutland Railroad, Rutland, Vt., is said to be planning for the installation of a number of electrically operated machine tools at its local locomotive repair shop and car repair works.

Winslow H. Robinson, Worcester, Mass., operating a sheet-metal working plant at 68 Prescott Street, has removed his establishment at 278 Grove Street, occupying a building recently erected for his use.

The Gilbert School, Winsted, Conn., is planning for the immediate erection of an addition to the machine shop at the school. The department will be used by the agricultural section of the institution.

The Eastern Bridge & Structural Co., Worcester, Mass., is planning for the operation of its plant on Crescent Street for general machine work. This plant was equipped by the company for production for the Government during the war. This will be an extension in production, the company having heretofore confined its work to fabricating operations, and devoting all machine work for its own service.

A new one-story machine shop, 36 x 70 ft., to cost $10,000, will be constructed by the Passaic Cotton Mills, New Bedford, Mass.

The Automatic Gold Chain Co., Ship Street, Providence, R. I., will build a two-story addition to its plant, 60 x 80 ft., to cost $18,000. Both the present structure and the extension will be occupied under lease.

George Muench, Stamford, Conn., has let the contract for a two-story brick addition to his plant, 35 x 132 ft., to cost $6,000.

U. S. Rubber Co., New York, is having plans prepared for an addition to its factory at Stoughton, Mass.

## Pittsburgh

PITTSBURGH, April 21.

The Pittsburgh Model Engine Co., Lexington Avenue and McPherson Street, Pittsburgh, manufacturer of engines, is planning the erection of a new works in the Point Breeze district to cost about $200,000. It will consist of three buildings, three stories, 64 x 180 ft.; two stories, 60 x 320 ft., and one story, 40 x 60 ft. J. M. Hanson is president of the company.

The Thomas M. Wilkins Water Regulator & Equipment Co., Pittsburgh, has been incorporated with a capital of $20,000 by Benjamin Finkelhor and associates, to manufacture water-regulating devices.

The Riter-Conley Mfg. Co., Pittsburgh, has awarded a contract to the Hughes-Foulkrod Co., Commonwealth Building, Philadelphia, for the construction of a one-story steel galvanizing plant, 65 x 250 ft., at its Leetsdale Works, to cost about $60,000.

The Dravo Contracting Co., Pittsburgh, has completed the construction of its shipways on Neville Island, and will soon inaugurate shipbuilding operations on the construction of barges for Mississippi River service.

The four-story building occupied by the Electric Mfg. & Repair Co. and the Baird Machinery Co., Pittsburgh, located on Duquesne Way, was destroyed by fire, April 11, with total loss estimated at $100,000. It is understood that the structure will be rebuilt.

The Kansas City Tire & Rubber Co., Chester, W. Va., is arranging for the reopening of its local plant, which has been closed for several months. The works gives employment to about 250 persons.

The Center Foundry Co., Wheeling, W. Va., has acquired about 2 acres, at Warwood, and plans the erection of a new plant to give employment to about 200 men.

The Bee Mfg. Co., Clarksburg, W. Va., has been organized to manufacture polishing devices for precision lathes. H. L. Bee, Salem, W. Va., is president, and J. J. Roberts, Clarksburg, vice-president.

The Interstate Gasoline & Oil Co., Fulton Building, Pittsburgh, has commenced the erection of a gasoline manufacturing works near Spencer, W. Va. It will be constructed on the unit plan, it being the intention to build other sections at an early date.

The West Penn Traction Co., Pittsburgh, is reported planning the erection of machine repair shops at South Warwood, W. Va., on a 10-acre site there.

The Carlisle Tire & Rubber Co., Carlisle, Pa., manufacturer of inner tubes for automobile tires, etc., has broken ground for an addition to practically double its present capacity, bringing production up to about 2500 inner tubes per day.

The Carbon Steel Co., Pittsburgh, will build a new boiler plant at Thirty-first Street and the Allegheny Valley Railroad, to cost, with new coal bunker, about $75,000.

## Baltimore

BALTIMORE, April 21.

The Magneto & Machine Co., 1031 Cathedral Street, Baltimore, has let contract for a two-story brick machine shop, 21 x 62 ft., to cost $2,500.

Charles H. McConnell, Chase Street and Maryland Avenue, Baltimore, will build a one-story brick machine shop, 42 x 93 ft., at 1013 Cathedral Street, to cost about $2,500.

The Baltimore Metal Products Co., Howard and Montgomery streets, Baltimore, has been incorporated with $25,000 capital stock to manufacture metals. The incorporators of the company are Samuel W. and Harold Tschudi and William C. Coleman.

The United States Air Products Co., Baltimore, has increased its capital stock from $100,000 to $150,000.

The Baltimore Marine Iron Works, Inc., Clement and Woodall streets, Baltimore, recently incorporated with $50,000 capital stock to repair ships or build and repair marine or stationary boilers, has purchased two lots adjoining its plant.

Irvin D. Baxter, 1111 Linden Avenue, Baltimore, will build a garage to cost $15,000.

R. P. Goode, Baltimore, will establish an automobile repair shop at Reisterstown Road and Garrison Avenue.

William W. Hellman, Baltimore, plans to establish a garage and blacksmith shop at 641-655 West Saratoga Street.

The American Agricultural Chemical Co., 1015 Fidelity Building, Baltimore, will install 150-hp. in motors at 2272 South Clinton Street.

Isaac Frenkel, Baltimore, will establish a wagon repair shop at Eden Street and Fairmount Avenue.

The Worthington Pump Machinery Corporation, New York, has been awarded a contract by the Board of Awards, Baltimore, for a centrifugal pump of 30,000,000 gal. per day capacity, for Mount Royal Pumping Station. It will cost $67,958.

The Jones & Lamb Co., Fulton and Pennsylvania avenues, Baltimore, packer, has acquired the Monumental Brewery, Highlandtown, and plans to reconstruct it as a packing plant, including a vegetable-oil refinery, ice plant, etc.

The Harvey Co., 113 South Street, Baltimore, wants prices on two 8-wheel, 10-ton locomotive cranes with 40 to 50-ft. boom; also on second-hand engine lathes.

In connection with the manufacture of small airplanes, the Maryland Pressed Steel Co., Hagerstown, Md., subsidiary of the Poole Engineering & Machine Co., Baltimore, does not plan to erect any additional buildings.

The Hagerstown Welding & Auto Works, Hagerstown, Md., has been incorporated with $50,000 capital stock by Peter J. and Cecelia McCormick and John J. Kernan.

The Pneumatic Disc Wheel Co., Richmond, Va., has been incorporated with $500,000 capital stock. B. V. McCray is president and T. B. Henderson is secretary.

A one-story boiler plant, 40 x 100 ft., will be erected by the St. Vincent's Orphan Asylum, Towson, Md., in connection with a new hospital. Francis E. Tormey, 813 Newington Avenue, Baltimore, is architect.

The Duryea Gun Mfg. Co., Wilmington, Del., has been incorporated with a capital of $400,000 by Phillip L. Garrett, Robert Weir and Alexander Jamison, to manufacture guns and ammunition.

The DeLoach-Blakely Machine Mfg. Co., 262 West North Avenue, Atlanta, Ga., is considering rebuilding the section of its machine works recently destroyed by fire with loss estimated at $10,000.

The Union Trunk Works, 2126 Toler Street, Richmond, Va., will build a two-story addition, 41 x 57 ft., to cost $10,000.

The Cumberland Railway & Power Co., Norfolk, Va., is planning the erection of a hydroelectric power plant at Fayetteville, with initial capacity of about 3000 hp.

The City Trustees, Mount Vernon, Ga., are planning the installation of a municipal electric power plant.

The Virginia Shipbuilding Corporation, Alexandria, Va., is considering the immediate rebuilding of its works recently destroyed by fire with loss reported at $35,000.

The Ordnance Department, Washington, D. C., has awarded contract to the Aberthaw Construction Co., Boston, Mass., for 12 new buildings at the Aberdeen Proving Grounds, Aberdeen, Md., each one story, 96 x 400 ft., estimated to cost $450,000 in all.

Hackley Morrison, Moore Building, Richmond, Va., wants prices on 80-hp. locomotive-type boilers.

The American Column & Lumber Co., St. Albans, W. Va., wants prices on 80 to 100-hp. boilers.

The Barker Milling Co., Morgantown, W. Va., wants prices on boilers, steam, gas or oil engines, motors and flour-mill machinery.

The Miami Electric Light Co., Miami, Fla., will install a generator and other equipment.

The Florida Electric Welding Co., Tampa, Fla., has been organized. U. J. Washburn is secretary.

McCay Brothers, West Palm Beach, Fla., want prices on wood-working machinery and a railroad for use in the construction of wooden vessels.

## Cleveland

CLEVELAND, April 21.

Local machinery houses received a fair volume of business the past week in scattered orders, mostly for lathes and drilling machines, which came largely from the automobile and tractor field. One local dealer took orders aggregating 30 machines from Detroit and another booked orders for 16 small lathes and 4 boring mills, the latter from the automobile tire industry. The Jones Gear Co., Cleveland, placed orders the past week for $50,000 worth of gear generating machines for its new plant. Nothing has developed in the way of round lot inquiries. Used machinery is moving fairly well. Reduction in lathe prices from 10 to 25 per cent from former prices has become quite general. Some machine tool builders are no longer following the policy of guaranteeing prices against a decline.

The local foundry trade has improved somewhat and plants are now operating on an average of about 65 per cent of capacity.

The Jones Gear Co., Cleveland, will place a contract in a few days for its new plant, which will include a main building 100 x 310 ft., one and two stories, and a heat treating building, 50 x 60 ft. A large part of the machinery equipment has been ordered.

The Minerva Engine Co., Cleveland, is reported to be contemplating the erection of a new plant. It has offices in the Vickers Building. C. S. Gaby is president.

The Paul Brothers Co., Cleveland, will erect a six-story power block on East Eighteenth Street, in which quarters will be provided for light manufacturing purposes.

The Accurate Machine Co., Whitney Power Block, Cleveland, has placed a contract for the erection of a plant 160 x 180 ft.

The Enterprise Aluminum Co., Massillon, Ohio, has placed a contract for the construction of a plant at an estimated cost of $20,000.

The Simmons Machine Co., 804 Dime Bank Building, Detroit, is inquiring for fifteen used metal working machines, including several lathes, a boring mill, milling machine, drilling machine, etc., and four wood-working machines.

H. H. Herrold, New Philadelphia, Ohio, will establish a machine shop in Wooster, Ohio, devoted largely to repair work. It will be located in a new building, 36 x 110 ft., contract for which has been placed and will be conducted under the name of the Herrold Machine Co., which has been incorporated with a capital stock of $20,000.

The Electric Auto-Light Co., Toledo, Ohio, has purchased a site adjoining the plant and it is reported will build an extension.

The Industrial Steel Castings Co., Toledo, has been incorporated with a capital stock of $100,000 as a reorganization of the former Taylor Coupler & Castings Co. and will shortly begin the manufacture of steel castings.

The City Machine & Tool Co., Toledo, has increased its capital stock from $75,000 to $175,000.

The Wilcox Automatic Bottle Machine Co., Martin's Ferry, Ohio, is planning the erection of new works.

It is reported that the Hobart Mfg. Co., Troy, Ohio, will make extensions to its plant, including a forge shop 50 x 80 ft.

The Wilmington Casting Co., Wilmington, Ohio, will erect a foundry, 28 x 115 ft., for which bids have been taken.

## Chicago

CHICAGO, April 21.

Business continues fairly good, with purchases distributed over a wide range of industries. Although tractor manufacturers are the best customers from the standpoint of the volume of orders, other buyers include a variety of manufacturers, among them makers of washing machines, wrapping, candy and baking machinery. The trade is more hopeful than heretofore that the Bucyrus Co., South Milwaukee, Wis., will take action on the list of tools which it issued some weeks ago. The Studebaker Corporation, which announced a list of about 90 tools last week, will make its selections through a representative at Detroit, but will close contracts at South Bend, Ind. It is reported that it is uncertain whether the Chicago, Burlington & Quincy will purchase the equipment called for in the list which it issued recently. Some dealers have received orders for tools to be used in connection with oil-well development in the Southwest.

A noteworthy development the past week was a reduction of about 20 per cent in the prices of engine lathes by a number of important makers. Although there have been a few recent reductions by manufacturers of other types of machines, the general feeling in the trade has been that prices in general would hold until some time after the spring meeting of the National Machine Tool Builders' Association, where costs will come under discussion.

Although business is of a miscellaneous character, some dealers report a strong demand for turret lathes. Deliveries, particularly on some of the standard types of machines, are improving, and, in fact, close to normal. In some instances, dealers are selling tools on the basis of taking equipment used for war work as part payment. In general, however, the tools used on war contracts are to be disposed of by the Government, which has not yet worked out its plan for their sale. There are conflicting reports regarding what will be done with the machinery used on munitions work by the Cribben & Sexton Co., Chicago, on which the local salvage board of the Government took bids some weeks ago but which were later ordered withdrawn from the market. One rumor has it that bids will again be taken in May, and another is to the effect that the equipment will be reserved for use in arsenals.

The plants of tool manufacturers at Madison, Wis., are closed on account of a strike.

The city of Chicago plans to utilize its machine shops full time by doing work for public utilities when not engaged for the municipality. This scheme, if it can be effected, will mean a saving to the city of $500,000, according to estimates of municipal authorities.

The Eli Bridge Co. is erecting a plant near the Wabash passenger station, Jacksonville, Ill., to cost $52,000. It will be 150 x 225 ft., with a wing 20 x 50 ft. at one end for office purposes. The Illinois Steel Bridge Co., Jacksonville, has the contract for the steel.

The Mueller Fountain & Fixture Co. is building a two-story plant at Decatur, Ill., instead of a one-story building as originally contemplated. It will be 60 x 160 ft., and will be erected north of the company's main factory.

The boiler shop of the Terminal Railroad Association,

Brooklyn, Ill., was damaged by fire of unknown origin April 17. The estimated loss is $100,000.

The citizens of Hamilton, Iowa, have subscribed $25,000 for the construction of a factory for the manufacture of inner linings for automobile tires. The building will be 90 x 140 ft., two stories. The trustees in charge of the funds include Fred Twesten, John A. Gordon, and E. L. Hanson, all of Hamilton.

The Win-Her Washer Co., Des Moines, Iowa, a new corporation with a capital stock of $100,000, will commence operations on May 1, at its factory, 814 Tuttle Street.

The Cedar Rapids Foundry & Machine Co., Cedar Rapids, Iowa, will build a one-story addition to its foundry on Second Avenue, 65 x 95 ft., to cost $10,000.

The Chandler Pump Co., Cedar Rapids, Iowa, is planning for the erection of a one-story addition on First Avenue, 40 x 65 ft. W. H. Dunshee is president.

In connection with its new refining plant on Avenue H, between Fifth and Ninth streets, Omaha, Neb., the Omaha Refining Co., Brandeis Theater Building, is planning for the later erection of a machine shop. The initial refining buildings will be one-story structures.

The Duluth Corrugating & Roofing Co., Duluth, Minn., will build a one-story addition to its works to cost about $40,000.

The Standard Four Tire Co., Keokuk, Iowa, is taking bids for the erection of a one and three-story addition, 60 x 65 ft., to cost $30,000.

## Cincinnati

CINCINNATI, April 21.

Price readjustments on machine tools that were made recently are said by competent authority to mean that the quotations will last through the remainder of the present year. This statement is predicated on the theory that no further reductions can be made unless labor and material costs are reduced. A few lathe makers who advanced prices during the war in order to discourage the placing of orders with them from domestic concerns, advanced their prices more than some of their competitors, and as a consequence, in order to get down to a sane level they have made cuts as high as 20 per cent. The average general reduction on lathes made in this territory by makers is estimated around 15 per cent. New prices have already been established on planing machines at a 20 per cent discount, and shaping machines have also been reduced on about the same ratio.

New business coming in is not of sufficient volume to warrant machine-tool makers in continuing operations at the present rate of production unless they are willing to stock machines, which is generally not considered a satisfactory proposition at present manufacturing costs. Both the domestic and export inquiry are fairly good, but actual orders are becoming somewhat scarcer.

The activities of jobbing foundries making a specialty of machine-tool castings have been cut down, and some plants are considering operating only three days a week.

The Lunken Window Co., Cincinnati, has been incorporated with $300,000 capital stock by E. H. Lunken and others. The company now operates a plant at Winton Place, which will be enlarged for the manufacture of a new form of window invented by Mr. Lunken.

The Cincinnati Car Co., Winton Place, Cincinnati, has recently booked an order for street cars to be constructed for the Cincinnati Traction Co., and intends adding some equipment.

The Long & Allstatter Co., Hamilton, Ohio, has formally taken over the former plant of the Buckeye Marble Co., which will be fitted up for the manufacture of farming implements.

The Midwest Casting Co., Middletown, Ohio, has been incorporated with $50,000 capital stock to operate a machine shop and foundry. The location for the proposed plant has not yet been given out. F. M. Wittlinger is general manager.

The Clifton-Pratt Co., Cincinnati, is in the market for a steel frame building approximately 70 x 220 ft., with a traveling crane runway to support a 10-ton crane.

The Burkett Closed Body Co., Dayton, Ohio, has been incorporated with $15,000 capital stock by L. T. Burkett and others. The company, which has heretofore been operated under a partnership arrangement, will build a new plant.

The Urbana Tool & Die Co., Urbana, Ohio, has been incorporated with $150,000 capital stock. It was formerly operated under a partnership arrangement. The officers of the company are: President, James K. Cheetham; secretary and treasurer, Joseph K. Cheetham; general manager, R. C. McDonald.

The Hobart Mfg. Co., Troy, Ohio, has had plans prepared for a forging shop addition, 60 x 70 ft., one story, of brick.

The Harrold Machine Co., Wooster, Ohio, has been incorporated with $20,000 capital stock by H. H. Harrold and others. Nothing is known as to manufacturing plans.

The Allen Motor Co., automobile maker, is removing its plants from Fostoria and Bucyrus, Ohio, to Columbus, Ohio. The former plant of the Columbus Buggy Co. will house the company, and an addition is planned.

The Pennsylvania Railroad Co. is making some additions to its shops and roundhouses at Columbus, Ohio.

The Tri-State Engineering Co., Zanesville, Ohio, has been incorporated with $5,000 capital stock by E. F. Frazier and others to deal in machinery.

## Philadelphia

PHILADELPHIA, April 21.

The General Engineering Works, 717 South Front Street, Philadelphia, has filed plans for a one-story addition to its machine shop, 57 x 148 ft., at South Front and Kenilworth streets, to cost $12,000.

The Philadelphia Sash Weight Works, Glenwood Avenue near Twenty-second Street, Philadelphia, is planning for a one-story addition, 70 x 145 ft.

The H. W. Butterworth & Sons Co., York and Cedar streets, Philadelphia, manufacturer of machinery and parts, has awarded contract to William Steele & Sons, Sixteenth and Arch streets, for a second-story addition, 40 x 60 ft.

Fretz Gross & Co., Twenty-second and Sedgley streets, Philadelphia, manufacturer of umbrella hardware, etc., will build a one-story addition, 75 x 192 ft., to cost $41,000.

The Lloyd Garrett Co., 229 North Twenty-third Street, Philadelphia, manufacturer of gas and electric fixtures, reflectors, etc., has acquired property at 1609-13 North Front Street, 51 x 100 ft., from the National Galvanizing Co., and adjoining land at 1615 North Front Street from other interests. Plans have recently been filed by the company for a two-story foundry addition, 20 x 42 ft.

The Near Steel Casting Co., Camden, N. J., has been incorporated with a capital of $50,000 by Thomas McAdoo, Atlantic City, and C. A. T. Eckert, Philadelphia.

The new plant of the Camden Motor Co., Camden, N. J., to be located on the White Horse Pike, Collingswood, N. J., will consist of a two-story structure, 300 x 350 ft., which with equipment is estimated to cost over $500,000. D. M. Davis, Temple Building, Camden, is one of the officials of the company.

The Bell Locomotive Works, Inc., 11 Pine Street, New York, manufacturer of industrial locomotives, is having plans prepared for alterations to a building at Bloomsburg, Pa., to which it is reported it will remove from its plant at Lincoln, N. J.

The American Toy & Novelty Works, York, Pa., has been incorporated with a capital of $50,000 by Carl H. Oermann and associates, to manufacture metal novelties, etc.

The P. M. Sharples Co., West Chester, Pa., manufacturer of cream separators and other farm equipment, is reported to be planning the removal of its works to a new location at Chester, Pa. It is said that a complete plant will be erected there. On April 12 fire caused a damage of about $5,000 at the West Chester works. C. M. Burdette is vice-president.

The Irwin Auto Machine Co., Wendell, Pa., has been incorporated with a capital of $20,000 by O. R. Reichen and associates.

The Pan-American Aircraft Co., Norristown, Pa., has been incorporated with a capital of $5,000 by Howard R. Watt and associates, to manufacture airplane parts.

The Reading Steel Casting Co., Reading, Pa., will build a one-story machine shop, 100 x 200 ft., to cost $50,000. J. T. Moore is president.

The Cambria Steel Co., Widener Building, Philadelphia, has had plans prepared for an addition at Johnstown to cost about $14,000.

The Heydt Motor Co., Reading, Pa., planning to increase its facilities, has filed with the Pennsylvania State Department notices of an increase in indebtedness from $6,500 to $10,000 and of an increase in capital stock from $20,000 to $65,000.

The firm of Corin Brothers, Philadelphia, has been incorporated to carry on an export and import iron and steel business. The capital is $10,000, and the incorporators are

Charles T. Fox, Wayne, Pa.; Magnus F. Corin, 511 Hansberry Street, and Eric G. Corin, Germantown, Philadelphia.

The Louis Ruger Co., Philadelphia, has been incorporated with a capital of $50,000 to manufacture architectural and ornamental sheet metal. Louis Ruger, 1945 North Sixth Street, Philadelphia, is the principal incorporator.

**Catalogs Wanted**

W. D. Mainwaring, metallurgical and production engineer, 1118 Chestnut Street, Philadelphia, has immediate use for catalogs pertaining to furnaces, rolling mills, power equipment, safety devices, steel plants and foundries, copper and brass rolling mills and foundries. Also office equipment for cost and production systems.

## Milwaukee

MILWAUKEE, April 21.

The demand for machine tools in general is steadily growing in volume. Milling machines are moving with increasing facility, although the main source of demand is the automobile, truck and tractor field.

In the past week, for the first time since the signing of the armistice, the advertising columns of local newspapers contained urgent appeals for skilled lathe and tool operators and experienced help of other classes. Unskilled labor is easy to procure, the supply being plentiful. Iron founders at Racine are experiencing some labor trouble, and the strike of union machinists and foundry workers at Madison is still on. The real issue in all of the walkouts appears to be recognition of the unions rather than other demands.

The Whitcomb Tool & Machine Co., Kenosha, Wis., is being reorganized at the Kenosha Wheel & Axle Co., with an authorized capital stock of $550,000, to manufacture steel wheels, front and rear axles, and other parts for automotive industries. James A. Whitcomb, principal owner, will be president and general manager. For the present, the existing shop on Strong Street will be used, although plans are being made for the erection of a complete group on a new site during the year. The investment will be from $100,000 to $150,000.

The Mechanical Appliance Co., 133 Stewart Street, Milwaukee, manufacturer of electric motors and other industrial specialties, has increased its capital stock from $125,000 to $300,000 to cover the expansion of the business and works. An addition was made to the plant last fall, increasing the capacity about 50 per cent. Louis Allis is president and Edward P. Allis III is secretary.

The Sur-Ku-Lator Boiler & Heater Co., Milwaukee, has been organized to take over and develop the business established some time ago by Joseph Antonuccio, formerly of Oakland, Cal., and inventor and designer of a new type of water heater. The factory at 293 Thirty-fourth Avenue, Milwaukee, will be enlarged. George P. Gerlinger, president Gerlinger Steel Casting Co., West Allis, is president and general manager; John Henry, vice-president; and T. W. Peterson, secretary and treasurer. Walter Gerlinger, secretary Gerlinger Electric Steel Foundry Co., will participate in the management.

The Klumb Engine & Machine Co., Sheboyygan, Wis., the business of which recently was reorganized as the Liberty Tractor Co. of Dubuque, an Iowa corporation, is moving its machinery and equipment to Dubuque, where the operation will be resumed about June 1 in a new manufacturing group. A machine shop, 80 x 180 ft., is ready for occupancy. An assembling floor, 60 x 300 ft., and a gas engine shop, 100 x 250 ft., will be added during the year. The Liberty company will employ 200 men at the start, and increase this to 500 or more within a year. Practically the entire output for twelve months has been contracted for. Paul Klumb is president and manager.

The J. E. F. Spark Plug Co., 1826 Brown Street, Milwaukee, has increased its capital stock from $100,000 to $300,000. The company is erecting a new plant costing about $30,600, to be ready June 1. Frank Ramstack is president.

The Badger Bearing Co., Milwaukee, has been incorporated with a capital stock of $8,000 to manufacture bearings and other mechanical specialties, parts and accessories. The incorporators are George W. Tuchel, Charles Stossman and George B. Piller, who is president of the Milwaukee Forge & Machine Co., 340 Oklahoma Avenue, Milwaukee.

The Reliance Motor Truck Co., Appleton, Wis., manufacturer of motor trucks and truck axles, at its annual meeting decided to make a bond issue of $50,000 to provide additional working capital. The estimated production for the coming fiscal year is 225 trucks. John M. Balliet is president and general manager.

The Manitowoc Plating Works, Manitowoc, Wis., which recently broke ground for a new plant, has increased its capital stock from $15,000 to $35,000. The officers are: President and general manager, Walter J. Wachowitz; vice-president and general superintendent, Stanley Buretta; Edwin Butz, secretary and treasurer. The company specializes in plating aluminum and other castings by a new retinning process.

The Peerless Paper Products Co., Menasha, Wis., will award contracts this week for a two-story mill addition, 40 x 150 ft., and an extension to the boiler house and transformer room, the whole to cost about $75,000, including new machinery. L. A. DeGuere, Grand Rapids, Wis., is consulting engineer.

The Schwab-LeZotte Boiler Co., Milwaukee, has let contracts for the erection of a boiler shop addition, 40 x 75 ft., of brick and steel, at Sixteenth and Canal streets, adjoining the new machine shop and forge works of the Philip Schwab Co. Philip Schwab is president of both concerns.

Thomas W. Orbison, Appleton, Wis., consulting engineer, has completed plans for a hydroelectric light and power plant to be constructed by Marquette County, Mich., at an estimated cost of $140,000. Bids will be taken by the County Commissioners during the week.

The Lloyd Mfg. Co., Menominee, Mich., manufacturer of baby cabs and carriages, reed furniture, etc., has engaged Derrick Hubert, architect, local, to prepare plans for a factory addition not to exceed $100,000 in cost, including equipment. Provision will be made for facilities to manufacture an automatic reed-weaving machine designed by Marshall B. Lloyd, president and general manager.

The Keller Tool & Machine Works, 601 Jefferson Street, Eau Claire, Wis., established several months ago, will undertake the manufacture of planer and milling machine vises and other mechanical appliances, in addition to doing jobbing and custom work. A stud bolt wrench and a stud bolt remover are among the inventions to be produced in quantity. Charles Keller is proprietor and manager.

The Badger Aluminum Co., Sheboygan, Wis., recently organized with $50,000 capital, is installing a pattern shop, machine shop and stamping and drawing shop in temporary quarters on the first floor of the S. W. Miller Piano Co.'s factory. For the present the company will contract with local foundries for the supply of castings. A 20-ton stamping press and other machinery, costing about $22,000, has been purchased.

The Parker Pen Co., Janesville, Wis., manufacturer of fountain pens, has revised plans for its new factory to provide for a four-story building, 100 x 150 ft., with a basement and sub-basement. The automatic department for making clips, gold pens, etc., will occupy the basement, and the sub-basement will be used as a boiler house, transformer room, etc. The cost will be $125,000. Frank A. Carpenter, architect, Rockford, Ill., is now taking bids.

F. E. Grosvold, Eau Claire, Wis., manufacturer of valves and other plumbers' goods, is engaging also in the production of galvanized-iron roof flanges and other sheet-metal specialties of his own design. Mr. Grosvold is organizing a corporation with $60,000 capital to take over and develop the business. The program contemplates the erection of a new factory later in the year.

The Northwestern Iron Co., Milwaukee, sustained an estimated loss of $40,000 to $50,000 on April 15 by the explosion of 35 tons of naphthaline awaiting shipment at its main plant at Mayville, Wis.

The Portage Furniture & Cabinet Works, Portage, Wis., has been organized to manufacture metal and wood furniture and cabinets. John J. Eichner, formerly connected with the Hamilton Mfg. Co., Two Rivers, Wis., is general manager. The factory occupies the former Fred Miller Building, to which a 40-ft. extension will be made.

## Detroit

DETROIT, April 21.

Within two months the local labor surplus of 40,000 has dropped to a deficit of 15,000, due to the rapid expansion of industries and partially to housing conditions. Thousands of more homes are needed and business men are forming combinations to build them. The Detroit Housing Association, headed by Frank Blair, president of the Union Trust Co., has raised a fund of $1,000,000 to build moderate-priced homes and to resell them to workingmen at cost on time. The Society for Savings, organized by the Board of Commerce and the Real Estate Board, is offering a similar service. Meanwhile, industrial concerns are building houses for their own employees.

Henry Ford is reported to be perfecting a street railroad

car propelled by internal combustion. He has asked for a blanket franchise to operate traction lines on any right-of-way in Dearborn township, where his tractor and Eagle plants are located.

The Standard Parts Co., Flint, Mich., has a new spring factory under construction to replace the present one now outgrown. It will have an immediate capacity four times greater than the old plant and will include at the outset three complete units.

The Pressed Metals Co. of America, with headquarters in Toronto, expects to establish a plant in Detroit to supply bronze bushings to automobile manufacturers of Michigan.

The Pattern & Castings Product Co., Saginaw, Mich., has been organized and will soon begin making a general line of wood and metal patterns, brass and aluminum castings and match plates. The president of the company is J. C. Green, president of the Modern Pattern & Machine Co. and Central Pattern Co., both of Detroit. M. B. Giberson, Detroit, is manager.

The city of Windsor, Ont., and border towns immediately adjacent, announce that more than $12,000,000 will be spent this year in building factories. The General Motors Corporation is planning to invest $6,000,000 in a plant at Walkerville; the Maxwell Motor Car., Inc., Detroit, $1,000,000; the Champion Spark Plug Co., Flint, Mich., $300,000, and the Auto Specialties Co., Detroit, $250,000. The Border Chamber of Commerce reports that more than 50 other American plants are negotiating for sites along the Canadian border across from Detroit.

The Columbia Motors Co., Detroit, which recently advertised for a manufacturing plant of at least 100,000 sq. ft. of floor space, is reported to be preparing plans for a new factory. It is stated that construction will be under way some time this year.

The Chalkis Co., Detroit, organized by Hugh Chalmers to manufacture ordnance, has started the manufacture of automobile parts. Hugh Chalmers is president, W. C. Kiser vice-president and general manager, and A. W. Lott secretary-treasurer.

The Culto-Tractor Co., Detroit, capitalized at $1,500,000 for the manufacture of farm tractors has taken over the Indian Village garage property and will turn it into a tractor plant. Production will start within 60 days. J. J. Rowe is president and P. H. Kramer secretary-treasurer.

The Olds Motor Works, Lansing, Mich., will erect seven additional buildings with a combined floor space of approximately 1,000,000 sq. ft., costing, with equipment, $4,500,000 and adding 2000 employees to the payroll. This is part of the $43,000,000 expansion program of the General Motors Corporation, of which the Olds Motor Works is a subsidiary. The structures consist of an axle plant of two units, each 140 x 750 ft., of saw-tooth construction, of brick, steel and glass, each to cost approximately $1,325,000; an addition to the assembly unit, 91 x 600 ft., four stories, to cost approximately $500,000; a building for sheet metal manufacture and enameling, 180 x 480 ft., and costing $400,000, with $150,000 for equipment. A plant 71 x 700 ft. is now being erected for the trimming and sewing department to cost $125,000. The plant which was started last summer and rushed to completion for the Government's war requirements is now being used for a motor building. It is 240 x 500 ft. and cost $1,000,000. In addition to these buildings are numerous additions to equipment, including a heating plant. Edward Ver Linden is president and general manager.

The new plant of the Yeomans Box Co., Detroit, plans for which are now being prepared, will consist of a main one-story and basement works, 175 x 225 ft., with one-story building adjoining, 23 x 85 ft., and one-story boiler and engine plant, 25 x 100 ft. Clarence W. Yeomans, 274 Wight Street, heads the company.

The Charles Bohn Foundry Co., 738 Hart Avenue, Detroit, has awarded a contract for its proposed new one-story foundry, 168 x 240 ft., at Chene Street and Finley Avenue, to Charles Reisford, 753 Greenwood Avenue. It will be equipped for the production of brass and aluminum castings.

The Brown-Wall Machine Co., Holland, Mich., is having plans prepared for the erection of a one-story addition, 60 x 70 ft., to be used as a foundry.

The Buick Motor Co., Hamilton and Industrial avenues, Flint, Mich., will soon commence the erection of a new one-story machine shop, 80 x 650 ft., to cost $50,000.

The Gillett Motor Products Co., Howard City, Mich., plans for the erection of a new one-story works, 50 x 100 ft., to be used for the manufacture of motors, parts, etc. R. J. Jennings is secretary.

The Advance Pump & Compressor Co., Battle Creek, Mich., is having plans drawn for the erection of an addition to its works.

The Saginaw Malleable Iron Co., Saginaw, Mich., it is reported, will double the capacity of its present plan by the erection of two additional units to cost $275,000, consisting of an annealing process building and a core building. One large addition is now being completed.

## St. Louis

ST. LOUIS, April 21

The Busch Sulzer Brothers Diesel Engine Co., Second and Utah streets, St. Louis, has let a contract to the Austin Co. for the construction of a two-story brick and steel foundry, 137 x 184 ft., to cost $70,000. The crane runway is also to be altered.

The Ever-Tight Piston Ring Co., 1600 Kingsland Avenue, St. Louis, is having an addition built at a cost of $40,000. New lathes will be installed.

The Advance Electric Co., 20 North Commercial Street, St. Louis will soon come into the market for lathes and punch presses for a new plant being erected at West Horton Place and Maple Avenue. Edward Bretch is president.

The Ajax Brass Co., a newly organized concern, is equipping a plant for the manufacture of brass and aluminum castings and homogeneous alloys at 4052 Cozens Avenue, St. Louis. Orville B. Baum is general manager.

The C. Nelson Mfg. Co., maker of ice cream freezers, Twenty-third and Division streets, St. Louis, is in the market for electric motors and wood-working machinery. Address J. L. Nelson.

The Traffic Motor Truck Corporation, St. Louis, which has just moved into a larger plant at 5500 North Broadway, is in the market for lathes, drill presses, screw machines, surface grinders, and other machine tools and power equipment.

Mackey & Langston, Blytheville, Ark., will equip a cotton-ginning plant requiring about $12,000 worth of machinery.

R. M. McElveen & Sons, Franklinton, La., will equip a cotton gin, and are in the market for $10,000 worth of machinery.

The Public Service Gin & Elevator Co., Kiowa, Okla., H. G. Hancock, R. W. Vaughan, and others interested, will equip a plant requiring about $25,000 worth of machinery.

The town of Arcadia, La., B. F. Barnette, mayor, will receive bids until May 14 on machinery for an electric light and waterworks plant.

The City Council, Kansas City, Mo., will enlarge its electric lighting plant at a cost of about $500,000.

The Newport Foundry & Machine Co., Newport, Ark., W. A. Holcomb of Poplar Bluff, Mo., president, will equip a plant with shapers, lathes, drill presses, pipe machines, electric motors, etc., for jobbing and manufacturing.

J. D. Jones, McAlester, Okla., 115 South Second Street, will erect a machine shop and garage, 126 x 133 ft.

The Machinery Exchange Co., New Orleans, La., is reported in the market for 350-hp. boilers and other power-plant equipment.

The town of Muscogee, Okla., W. W. Gilbert city clerk, is receiving bids for three triple combination pumping engines and other fire apparatus.

The city of Marksville, La., will receive bids until May 1 for oil engine pumping set and other waterworks equipment. X. A. Kramer, Magnolia, Miss., is engineer.

Russell Gardner, St. Louis, is preparing for the construction and equipment of a plant for the manufacture of a low-priced automobile, whose design and specifications have been decided upon. A plant capable of quantity production will be constructed as soon as plans can be prepared.

The Mobile Tractor Co., Birmingham, Ala., is reported to be planning for the establishment of a new plant for the manufacture of tractors. Frank J. Ryan is president.

The Joubert & Goslin Machinery & Foundry Co., New Orleans, La., manufacturer of sugar machinery, has awarded a contract to the Ingalls Iron Works, Birmingham, Ala., for the construction of a new machine shop to cost about $30,000.

Fire recently destroyed a large section of the works of the Tennessee Coal, Iron & Railroad Co., Fairfield, Ala., with loss reported at $65,000. The damaged structures include the machine shop, forge and blacksmith shop, carpenter and woodworking shop, rigger shop and electric substation. It is understood that the buildings will be reconstructed.

## Indianapolis

INDIANAPOLIS, April 21.

The Indianapolis Drop Forge Co., Indianapolis, has awarded a contract to Nichols Noe, 406 Lombard Street, for the construction of a one-story addition to its plant on Madison Avenue, 50 x 135 ft., to cost $10,000.

The Giant Gas Generator Co., East Chicago, Ind., has been incorporated with a capital of $50,000 by William F. Speedy, Samuel Wheale and Warren P. Ballard, to manufacture gas generating equipment.

The Victor Tractor Co., Greensburg, Ind., has completed plans for remodeling its one-story plant, 50 x 150 ft., to provide increased operating facilities. The work will cost about $25,000. Paul Trotter, Third National Bank Building, is manager.

The Willard F. Meyer Diamond Saw Co., Bedford, Ind., manufacturer of tools, jigs, dies, and automatic-machine parts, has changed its corporate name to the W. F. Meyer Co.

The Vulcan Storage Battery Co. has purchased the plant at Brazil, Ind., formerly occupied by the Brazil Stamping & Mfg. Co., and will install machinery immediately for the manufacture of the Liberty storage battery.

The Evansville Enameling Co. has purchased property in Evansville, Ind., for the erection of a plant for enameling, nickel plating, refining, stamping and polishing stoves and household apparatus. The company was organized with a capital stock of $50,000 by the various foundries and stove makers of the city. The directors include John W. Boehne, Henry Karges, Edward Kiechle, Sol A. Reese, Charles F. Diekman, William Boetticher, Fred Erlbacher and Benjamin Bosse.

## Texas

AUSTIN, April 19.

The taxpayers of San Angelo have voted $500,000 bonds, the proceeds to be used for the construction of municipal electric light and waterworks plants, or the purchase of the plants owned by the San Angelo Water, Light & Power Co., subsidiary of the Interstate Electric Corporation of New York.

The Southland Gin Co., Southland, will build a cotton gin to cost $15,000. J. E. Rogers is president.

The Humble Oil & Refining Co., Houston, will equip an electric power plant for operating the pumping plants of its oil wells in the Goose Creek district. It will also provide power for outside industries.

The Gulf Pipe Line Co., Beaumont, will construct a loading dock near the mouth of the Brazos River, below Freeport, to handle oil shipments.

F. A. Hornaday, Joplin, Mo., and associates, plan to lay a natural gas pipe line from gas wells near Three Rivers to San Antonio, a distance of about 100 miles.

The Southern Wire & Iron Co., Dallas, has increased its capital stock from $20,000 to $50,000.

The Woods Springless Shade Roller Co., Dallas, which has just been incorporated with a capital of $100,000, will build a plant for manufacturing a patented device. H. M. Gardner is a stockholder.

Z. T. White, El Paso, and associates, have selected a site for a 3000-bbl. oil refinery which they will build.

The Alamo Oil & Refining Co., Eastland, has purchased a site for a 1200-bbl. oil refinery at that place. Construction will be started soon.

The Burkburnett Machine & Tool Co., Burkburnett, which has been incorporated with a capital of $30,000, will build a machine shop. R. D. Hill is a stockholder.

The Elgin Standard Brick Mfg. Co., Elgin, has been incorporated with a capital of $75,000. The incorporators are W. C. Rivers, G. W. Prewitt and W. H. Rivers, Jr., all of Elgin.

The Galena-Signal Oil Co., New York and Houston, will increase the capacity of its oil refinery on the ship channel near Houston to 16,000 bbl. per day.

The Texas Producing & Refining Co. has purchased a 50-acre tract at Fort Worth upon which it will build a 4000-bbl. oil refinery.

The Twin Cities Glass Co., Texarkana, has been incorporated with a capital of $100,000. The incorporators are Leo Krouse, Orrie Colaw and Louis Heilbron.

The State Refining Association has purchased a site at Dublin for an oil refinery, the construction of which will be started soon. B. R. Anderson is president of the company.

The Compania de Hielo y Refrigeracion El Norte, Tampico, Mexico, has been organized with a capital of $100,000 to build an ice plant of 60 tons daily capacity and a refrigerating plant of 16,000 cu. ft. capacity. Robert G. Mead is at the head of the project.

## The Central South

LOUISVILLE, April 20.

There is a fair demand for boilers, refrigerating machinery and pumps. Considerable business is coming from the oil fields, with a steady demand for wire cable, boilers, drills, casing, etc. There is also a good volume of business for mine supplies, as the coal industry is again picking up.

James B. Wilson, engineer Louisville Water Co., Louisville, started work this month on a $350,000 power plant at the Riverside Station. The company is making improvements costing $1,000,000 for an increased capacity of 40,000,000 gal. per day by Jan. 1.

The Stimpson Computing Scale Co., Louisville, capitalized at $350,000, has been incorporated, and is equipping a plant in the Snead Building. Henry W. Imorde, Walter F. Stimpson and J. Stoddard Johnson are the incorporators.

The W. J. Flescher Petroleum Co., Lexington, Ky., plans the erection of a refinery with a daily capacity of 1000 to 5000 bbl.

The Buzz Engineering Co., manufacturer of deep-well pumps, Louisville, has increased its capital from $50,000 to $100,000. Davis Brown is president.

The W. F. Millner Rubber Co., Louisville, has been incorporated with a capital of $10,000 by W. F. Millner, R. B. Rivers and B. M. Rivers, Jr., to manufacture rubber products.

The Madison Coal Corporation, Central City, Ky., is planning for the rebuilding of its coal tipple, recently partially destroyed by fire.

## The Pacific Coast

SEATTLE, April 15.

Many lines of industry are showing marked activity. The demand for pumping machinery for irrigation purposes in north central Washington the past two months has never been equalled. Scores of new irrigation projects are being developed, and many plants that have outlived their usefulness are being replaced with modern equipment. Second-hand equipment is scarce and in great demand.

Reports from mining districts indicate renewed activity. Many properties that have lain idle for two years, due to scarcity of labor and difficulty in securing machinery, are being opened up and developed.

The farming districts will also be heavy buyers of equipment during the summer.

T. R. Slusher, Selah, Wash., plans the construction of an addition to his cold storage plant to cost $50,000. It will contain special handling equipment.

The Lake Union Dry Dock & Machine Works, Seattle, has purchased a $30,000 tract of land on Lake Union, on which will be erected an oil station, machine shop, and a 1000-ft. dock. The improvements will cost $50,000.

The lumber mill of the Anaconda Copper Mining Co., Bonner, Mont., destroyed by fire several months ago, is being rebuilt. It will be a three-band mill, with capacity of 220,000 ft. per day. The principal product will be mine timbers.

The Island Lumber Co., St. Helens, Ore., recently incorporated for $50,000, plans the construction of a new sawmill to specialize in railroad ties and mining timber. It will have a daily capacity of 50,000 ft. J. S. Hamilton, Portland, is president. A loading dock will also be built.

The Oregon Box & Lumber Co., North Bend, Ore., recently organized with a capital stock of $50,000 by George P. Sheridan, et al, has taken over the plant of the Callaghan & Clark Box Co., and plans extensive improvements to increase the output.

The Marine Repair & Construction Co., Portland, has let contract for work to increase its repair plant from one to six ways, capable of handling 200-ft. ships. Several new buildings will also be erected.

The plant of the Hoquiam Sash & Door Co., Montesano, Wash., was destroyed by fire recently caused by an explosion in the boiler room, with a loss of $100,000. It is reported it will be rebuilt.

Elmer Dover, Tacoma, announces that a syndicate which he heads plans the construction of a $300,000 rubber plant

in that city. It will be the first unit of a $5,000,000 corporation.

It is reported that the Horne Manfg. Co., Brooklyn, N. Y., will locate a factory in Seattle for the manufacture of marine electrical equipment. It has a branch office at 222 Grand Trunk Dock.

Harry Alldis, Chehalis, Wash., plans an addition to his foundry that will double the present capacity. A pattern plant will also be added and new equipment installed.

The Howard Man. Co., manufacturer of woodenware specialties, 660 West Ewing Street, Seattle, plans the erection of a two-story addition, 40 x 43 ft. New machinery will be installed.

The Elmer & Moody Co., Seattle, has purchased a large site at Terry Avenue and Thomas Street, on which will be built a sash and door factory.

The Flower Man. Co., Inc., Fresno, Cal., announces that it will build a factory for the manufacture of the motor meter lock, designed to prevent theft of motors.

The Dixon Hardware & Implement Co., Santa Rosa, Cal., has been incorporated with a capital of $30,000 by R. D. Dixon, E. W. Gould and W. F. Geary.

The White Foundry Co., Stockton, has been incorporated with a capital of $50,000 by H. C. White, Frank A. Guernsey and L. F. Grimsley.

## Canada

TORONTO, April 21.

The Acme Electro Plating Co., Ltd., 64 Richmond Street, Toronto, recently incorporated with a capital stock of $40,000 has taken over the plant and business of Walter E. Lewis. The new concern plans to extend its lines and will enlarge its premises and will require new equipment shortly. Walter E. Lewis is president.

The Norton Tool & Machine Co., 360 Pape Avenue, Toronto, manufacturer of dies, jigs, etc., plans to extend its line of production. The officers are: Henry A. Ritchie, president; Ruben Norton, vice-president, and Alfred H. Child, secretary-treasurer.

The Montreal Portland Cement Co., Ltd., Montreal, recently incorporated, has purchased 45 acres at Point-Aux-Trembles for $40,000 and construction on a cement plant to cost $250,000 will be commenced at once. It will eventually have a capacity of 4500 bbl. per day, but will be producing 1000 bbl. per day by September next. Robert Dodd is president.

The Miramichi Construction Co., New Castle, N. B., has taken over the assets of the International Shipbuilding Co., consisting of shipyard plant, machinery, material, etc. H. A. Frank is manager of the new concern.

The Canada Metal Co., Ltd., Fraser Avenue, Toronto, is building in Halifax, N. S., a rolling mill to make sheet lead and facilities for making lead pipe; also a brass foundry.

The Nova Scotia Shipbuilding Co., New Glasgow, N. S., is building a machine shop in connection with its plant.

The city of Dundas, Ont., will install sewage disposal works to cost $50,000. John S. Fry is clerk.

W. H. Heath & Sons, Wallaceburg, Ont., will rebuild their planing mill and sawmill recently destroyed by fire with a loss of $17,000 and are asking for prices on material and equipment.

J. C. Pennington, La Belle Building, Windsor, Ont., has been appointed architect for the erection of a factory for the Auto Specialty Mfg. Co. of Canada, McDougall Avenue, Windsor, to cost $50,000.

The Pigott-Healy Construction Co., 36 James Street South, Hamilton, Ont., is in the market for a portable stone crusher capable of turning out ½-in. to 2-in. stone; capacity 25 tons of 2-in. stone.

The Town Council, Clarks Harbor, N. S., will build an electric light plant to cost about $40,000. M. G. Nickerson is interested.

The City Council, Riviere Du Loup, Que., will have work started at an early date on an addition and improvements to the lighting and power system to cost $40,000.

The Canadian Billings Spencer Co., Welland, Ont., is in the market for a No. 5 Becker vertical milling machine or No. 3 Pratt & Whitney; also 24-in. shaper, Gould & Eberhardt or Potter & Johnston.

Bruce Stewart & Co., Ltd., Charlottetown, P. E. I., is in the market for a single frame steam hammer about 8-in. cylinder, 20 to 24-in. stroke.

The Premier Retread Co., Ltd., Toronto, has been incorporated with a capital stock of $25,000 by Harold E. McKittrick, Room 237, 17 Queen Street East; Frank Brennan, Raymond C. O'Donoghue and others to manufacture machinery, automobile accessories, parts, etc.

The Canadian Durkee-Atwood Co., Ltd., Toronto, has been incorporated with a capital stock of $20,000 by Alexander D. McKenzie, 156 Yonge Street; Sophia Tutty and others to manufacture automobile supplies, accessories, etc.

The Canadian Hauck Burner Co., Ltd., Toronto, has been incorporated with a capital stock of $10,000 by Arthur L. Reid, 1126 Traders Bank Building; Charles H. C. Leggott, 116 Arundel Avenue; William F. Ferry and others to manufacture oil burners, appliances, machinery, etc.

The S. F. Bowser Co., Ltd., Toronto, has been incorporated with a capital stock of $750,000 by Elmer E. Cummings, 66 Fraser Avenue, Toronto; Sylvanus F. Bowser and John Grosvenor, both of Fort Wayne, Ind.; and others, to manufacture oil storage and handling devices, machinery, etc.

The Crowe's Iron Works, Ltd., Guelph, Ont., has been incorporated with a capital stock of $200,000 by Charles L. Dunbar, Leo W. Goetz, John Sutherland, Jr., and others to manufacture machinery, tools, implements, etc.

The Montreal Armature Works, Ltd., Montreal, has been incorporated with a capital stock of $50,000 by Samuel D. Sweetnam, Stanley H. Cunha, Philip J. Dolan and others to take over the business now carried on by the Eastern Electric Co., Montreal, to manufacture electrical and mechanical appliances, tools, etc.

Casavant Freres, Ltd., St. Hyacinthe, Que., has been incorporated with a capital stock of $1,000,000 by Joseph C. and Samuel Casavant, Charles J. Laframboise and others, to take over the business now carried on under the name of Casavant Freres, to manufacture musical instruments, etc.

The Fenwick Battery Co. of Canada, Ltd., St. John, N. B., has been incorporated with a capital stock of $18,000 by Cuthbert J. Morgan, Charles W. Ruddock, Arthur C. Thompson and others to manufacture batteries and other electrical equipment.

H. H. Symmes & Co., Ltd., Montreal, has been incorporated with a capital stock of $25,000 by Frank Callaghan, Francois X. A. Biron, Ethel M. Pierce and others, to manufacture cement, sheet metal, roofing material, etc.

Forest, Jackson & Forest are opening an office in the Witness Building, Craig Street, Montreal, to carry on a general brokerage business in steel, metals and machinery.

The H. M. Lane Co., Ltd., Windsor, Ont., recently incorporated with a capital stock of $10,000, has been organized to handle the growing engineering and architectural business in Canada of the H. M. Lane Co., Owen Building, Detroit, industrial and foundry engineer, not to manufacture machinery or tools, as has been stated.

## Ocean Rates on Machine Tools

Robert S. Alter, who heads the export department of the Cincinnati Chamber of Commerce, has prepared some very interesting figures dealing with the present ocean freight rates on machine tools.

One illustration of the cost of transporting machine tools is the rate from New York to Antwerp. A standard 14-in. x 6-ft. engine lathe would cost $75, or more than 11 per cent of its present value of $705 f.o.b. New York. A standard heavy duty 24-in. x 12-ft. lathe would cost $250, more than 13 per cent of its present value of $1900. Mr. Alter states that it is true the United States Shipping Board's rates are lower, figuring $37 for the first mentioned lathe and $122 for the latter, but no space can be obtained on these vessels.

The situation is the same as far as transportation rates on the Pacific are concerned, and freight rates from England to Japanese ports are very much lower than they are from San Francisco or Seattle.

With the relaxation of some import restrictions on the other side, it is apparent that the ocean freight rate question is now the most important one to be considered by manufacturers and exporters.

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The Braemer Air Conditioning Corporation has changed its name to the Atmospheric Conditioning Corporation, with executive offices in the Lafayette Building, Philadelphia. It manufactures the Webster air washer, the Webster system of automatic humidity control and equipment for maintaining artificial atmospheric conditions in industrial plants.

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Former employees of the Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa., have formed an alumni club and held a reunion and dinner in the rooms of the Americus Club, Pittsburgh, on Tuesday evening, April 22.

# Current Metal Prices

**On Small Lots, from Merchants' Stocks, New York City**

The quotations given below are for small lots, as sold from stores in New York City by merchants carrying stocks.

As there are many consumers whose requirements are not sufficiently heavy to warrant their placing orders with manufacturers for shipment in carload lots from mills, these prices are given for their convenience.

On a number of articles the base price only is given, it being impossible to name every size.

The wholesale prices at which large lots are sold by manufacturers for direct shipment from mills are given in the market reports appearing in a preceding part of THE IRON AGE under the general headings of "Iron and Steel Markets" and "Metal Markets."

### Iron and Soft Steel Bars and Shapes

| | Per lb. |
|---|---|
| Bars: | |
| Refined iron, base price | 3.37c |
| Burden's H. B. & S. bar iron, base price | 6.30c |
| Burden's best bar iron, base price | 6.50c |
| Swedish bars, base price | 20.00c |
| Soft Steel: | |
| ¾ to 1⅞ in., round and square | 3.37c |
| 1 to 6 in. x ⅜ to 1 in. | 3.37c |
| 1 to 6 in. x ¼ and 5/16 | 3.47c |
| Rods—⅝ and 11/16 | 3.42c |
| Bands—1½ to 6 x 3/16 to No. 8 | 4.07c |
| Shapes: | |
| Beams and channels—3 to 15 in. | 3.47c |
| Angles: | |
| 3 in. x ¼ in. and larger | 3.47c |
| 3 in. x 3/16 and ⅛ in. | 3.72c |
| 1½ to 2½ in. x ⅛ in. | 3.52c |
| 1½ x 2¾ in. x 3/16 in. and thicker | 3.47c |
| 1 to 1¼ in. x 3/16 in. | 3.52c |
| 1 to 1¼ in. x ⅛ in. | 3.57c |
| ⅞ x ⅞ x ⅛ in. | 3.62c |
| ¾ x ⅛ in. | 3.67c |
| ⅝ x ⅛ in. | 4.47c |
| ½ x 3/32 in. | 5.17c |
| Tees: | |
| 1 x ⅛ in. | 3.87c |
| 1¼ in. x 1¼ x 3/16 in. | 3.77c |
| 1½ to 2½ x ¼ in. | 3.57c |
| 1½ to 2½ x 3/16 in. | 3.57c |
| 3 in. and larger | 3.52c |

### Merchant Steel

| | Per lb. |
|---|---|
| Tire, 1½ x ½ in. and larger | 3.37c |
| Toe calk, ½ x ⅜ in. and larger | 4.72c |
| Open-hearth spring steel | 6.00c |
| Standard cast steel, base price | 14.00c |
| Extra cast steel | 18.00 to 20.00c |
| Special cast steel | 23.00 to 25.00c |

### Tank Plates—Steel

| | Per lb. |
|---|---|
| ¼ in. and heavier | 3.67c |

### Sheets

*Blue Annealed*

| | Per lb. |
|---|---|
| No. 8 and 3/16 in. | 4.52c |
| No. 10 | 4.55c to 4.57c |
| No. 12 | 4.60c to 4.62c |
| No. 14 | 4.65c to 4.67c |
| No. 16 | 4.75c to 4.77c |

*Box Annealed—Black*

| | Soft Steel C. R., One Pass, per lb. | Wood's Refined, per lb. |
|---|---|---|
| Nos. 18 to 20 | 5.30c | — |
| Nos. 22 and 24 | 5.35c | 6.95c |
| No. 26 | 5.40c | 7.00c |
| No. 28 | 5.50c | 7.15c |
| No. 30 | 5.70c | — |

No. 28, 36 in. wide, 10c higher.
Wood's Keystone Hammered, 18-24 gage, 9¾c; 26-28 gage, 10¼c.

*Galvanized*

| | Per lb. |
|---|---|
| No. 14 | 5.60c |
| No. 16 | 5.75c |
| Nos. 18 and 20 | 5.90c |
| Nos. 22 and 24 | 6.05c |
| No. 26 | 6.20c |
| No. 27 | 6.35c |
| No. 28 | 6.50c |
| No. 30 | 7.00c |

No. 28, 36 in. wide, 20c. higher.

### Corrugated Roofing, Galvanized

2½ in. corrugations, 10c. per 100 lb. over flat sheets.

### Steel Wire

BASE PRICE* ON NO. 9 GAGE AND COARSER

| | |
|---|---|
| Bright basic | 5.50c |
| Annealed soft | 5.50c |
| Galvanized annealed | 6.25c |
| Coppered basic | 6.25c |
| Tinned soft bessemer | 7.50c |

*Regular extras for lighter gages.

### Brass Sheet, Rod, Tube and Wire

BASE PRICE

| | | |
|---|---|---|
| High Brass Sheet | 20c | to 21¾c |
| High Brass Wire | 20c | to 21¾c |
| Brass Rod | 19c | to 20¾c |
| Brass Tube | 30¾c | to 35c |

### Copper Sheets

Sheet copper, hot rolled, 16 oz., 22½c. to 25c. per lb. base.
Cold rolled, 14 oz. and heavier, 1c. per lb. advance over hot rolled.

### Tin Plates

| | Bright Tin | | Coke—14x20 | | |
|---|---|---|---|---|---|
| | Grade "AAA" Charcoal 14x20 | Grade "A" Charcoal 14x20 | | Primes | Wasters |
| | | | 80 lb. | $8.30 | $8.05 |
| | | | 90 lb. | 8.40 | 8.15 |
| | | | 100 lb. | 8.55 | 8.30 |
| IC | $11.30 | $10.05 | IC | 8.80 | 8.55 |
| IX | 13.50 | 12.00 | IX | 10.00 | 9.75 |
| IXX | 15.25 | 13.75 | IXX | 10.95 | 10.70 |
| IXXX | 17.00 | 15.50 | IXXX | 11.90 | 11.65 |
| IXXXX | 18.75 | 17.25 | IXXXX | 12.85 | 12.60 |

### Terne Plates

8-Lb. Coating 14x20

| | |
|---|---|
| 100 lb. | $8.50 |
| IC | 8.65 |
| IX | 9.65 |
| Fire door stock | 11.50 |

### Tin

| | |
|---|---|
| Straits pig | 74c to 75c |
| Bar | 85c to 90c |
| American pig, 99 per cent | 70c to 72c |

### Copper

| | |
|---|---|
| Lake Ingot | 18c to 19c |
| Electrolytic | 17c to 18c |
| Casting | 16½c to 17½c |

### Spelter and Sheet Zinc

| | |
|---|---|
| Western spelter | 8½c to 9c |
| Sheet zinc, No. 9 base, casks | 12c; open 13c |

### Lead and Solder*

| | |
|---|---|
| American pig lead | 6½c to 7c |
| Bar lead | 7½c to 8½c |
| Solder ½ & ½ guaranteed | 45c |
| No. 1 solder | 40c |
| Refined solder | 34c |

*Prices of solder indicated by private brand vary according to composition.

### Babbitt Metal

| | |
|---|---|
| Best grade, per lb. | 90c |
| Commercial grade, per lb. | 55c |

### Antimony

| | |
|---|---|
| Asiatic | 8½c |

### Aluminum

| | |
|---|---|
| No. 1 aluminum (guaranteed over 99 per cent pure), in ingots for remelting, per lb. | 37c to 38c |

### Old Metals

Business is very quiet. Dealers' buying prices are nominally as follows:

| | Cents Per L. |
|---|---|
| Copper, heavy and crucible | 13.00 |
| Copper, heavy and wire | 12.00 |
| Copper, light and bottoms | 10.50 |
| Brass, heavy | 8.00 |
| Brass, light | 6.00 |
| Heavy machine composition | 12.50 |
| No. 1 yellow rod brass turnings | 7.25 |
| No. 1 red brass or composition turnings | 10.00 |
| Lead, heavy | 4.00 |
| Lead, tea | 3.50 |
| Zinc | 4.25 |